LEADING CLAY JOURNAL OF THE WORLD / A CAHNERS PUBLICATION / SEPTEMBER, 1961 / 75c

Brick & Clay RECORD

AutoClayMation in Action—Key to the Industry's Future—Page 5

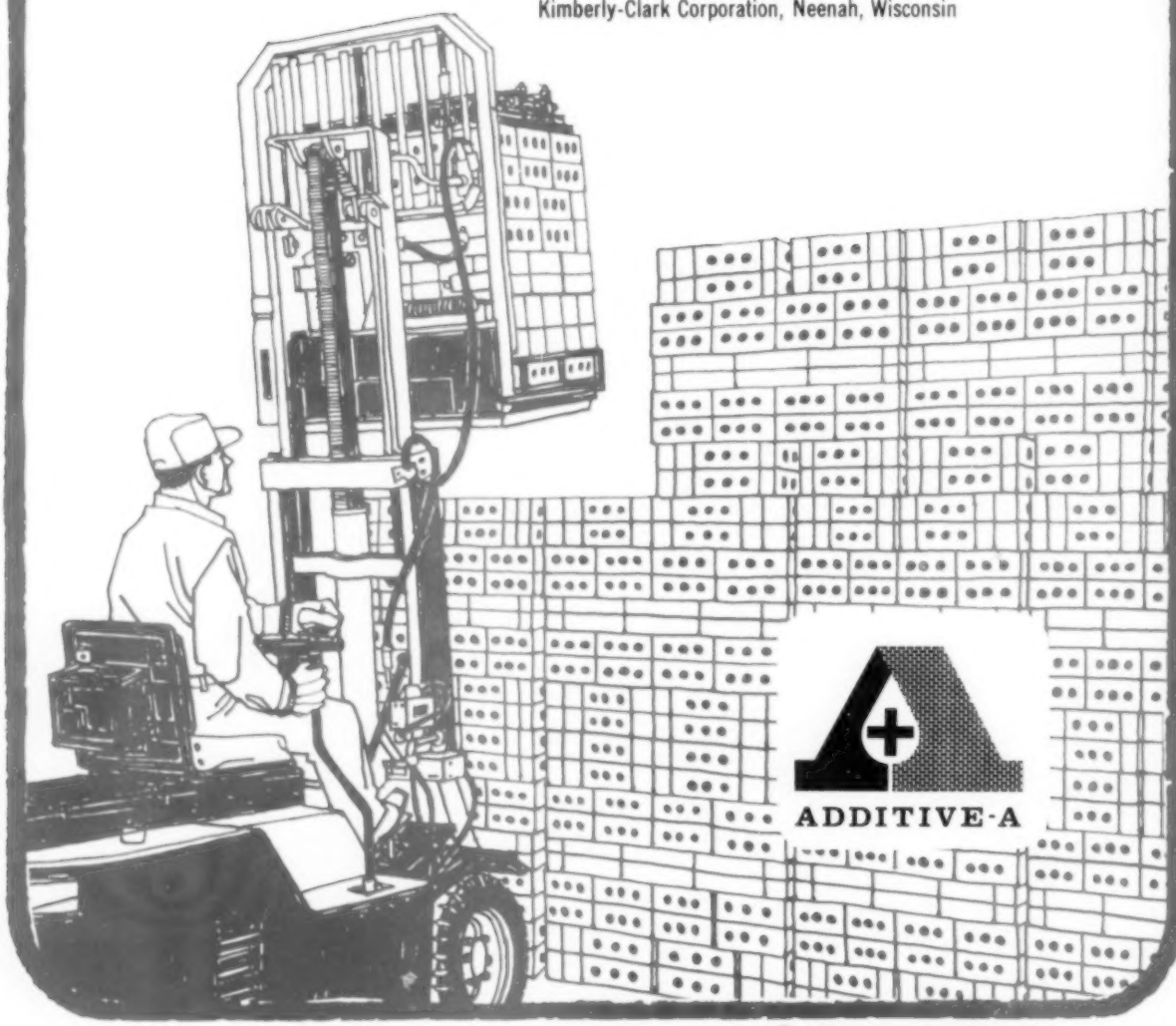
AUTO CLAY MATION 1961

PAGE 35

OHIO BRICKMAKER INCREASES DRY GREEN STRENGTH WITH ADDITIVE-A®

ALLIANCE, OHIO – "Since we started using Additive-A clay conditioner there has been a general improvement in the quality of our finished ware," says Mr. James Wilcox, president, Alliance Clay Products Co. "We're getting more uniform temper at the pug mill and extrusion is easier with less power. Drying time has been shortened and drying temperatures reduced. Both wet strength and dry green strength have increased thereby reducing chipping and breakage of dried bricks."

For descriptive folder on Additive-A, write to:
Chemical Products, Department No. BCR-91,
Kimberly-Clark Corporation, Neenah, Wisconsin



Contributing Associate S C P I Kimberly-Clark

Circle Service No. 1

New Improved H-30 **PAYLOADER**®

25% more capacity – many new features

When the H-30 was originally introduced, more than a year and a half ago, it was far ahead of all tractor-shovels in its class. It has been exceptionally well received by contractors, public bodies, sand and gravel producers, and many others — praised by owner and operator alike.

Now, HOUGH'S continuing program of research, development and improvement, creates the new H-30 series "B" model — an even better machine.

More Capacity: With 1¼ cu. yd. bucket, this new model has 25% more capacity without sacrificing the exceptional stability and balance of the original H-30.

More Safety: The only loader in its class with boom arms positioned ahead of and away from the operator. It has walk-in operator compartment, new hand rails, new adjustable bucket seat and unmatched operator visibility.

Less Maintenance: The only loader in its class with simplified boom mechanism having 6 to 12 fewer pivot and grease points to service. All bucket and lower-boom pivot points sealed against dust and dirt.

More Power: More hp per pound than comparable loaders. Torque-converter proportions power properly between drive-train and hydraulic needs.

Better Braking: Only loader in its class with 4-wheel, sealed hydraulic brakes, and with "Operator's choice" dual brake pedals that permit operator to brake with or without transmission engaged. Exclusive HOUGH axle design allows servicing of brakes without removing and exposing the planetary hubs to dust and dirt.

It's the only loader in its class with full power-shift transmission that does not have to stop for "range" shifts . . . with separate fan-cooled oil-to-air radiator to cool torque-converter transmission oil . . . with closed, pressure-controlled hydraulic system to keep out air-borne dust and moisture.

For additional information, see your HOUGH distributor.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

9-B-3R

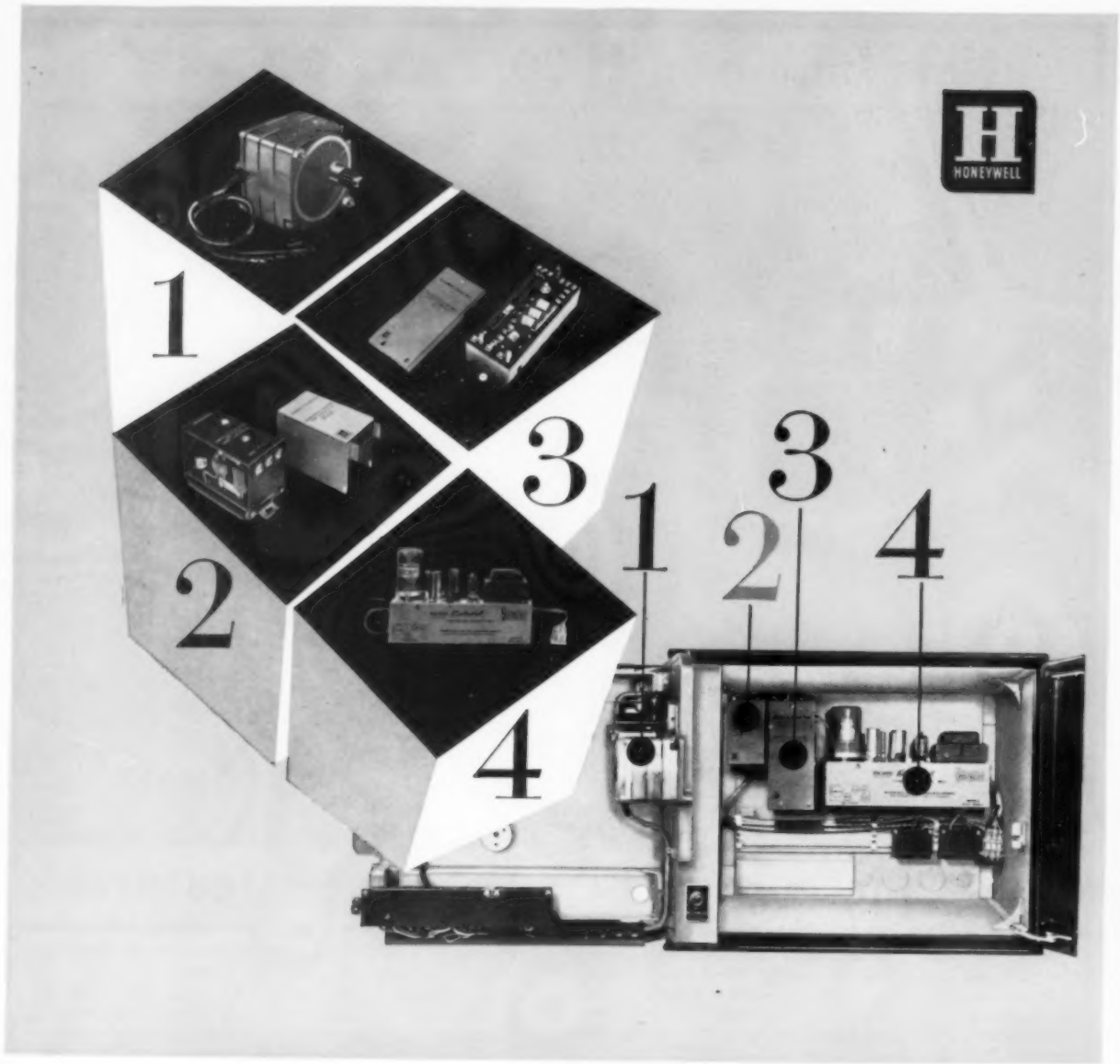
9-B-3

THE FRANK G. HOUGH CO.
753 Sunnyside Ave.
Libertyville, Ill.

Send Complete Data on H-30B Payloader

Name _____
Title _____
Company _____
Street _____
City _____ State _____

Circle Service No. 2



It's what's in the modules that matters!

Take the newly designed modules in ElectroniK 15 Potentiometers. These modules have operating and servicing features that represent the very latest developments in the art of reliable instrumentation—**1.** Sectionalized motor module makes servicing a snap. Any major part of the servo or chart drive motors can be replaced in a matter of minutes. **2.** Line-powered constant voltage module provides a completely automatic d-c voltage source and replaces batteries, standard cells, and standardization mechanisms. **3.** Quick-change measuring circuit module reduces range or actuation changes to simple screwdriver operation. **4.** Quick-connect amplifier module is easily removed for servicing. Over 15 models available—for gain up to 40 x 10^6, for input impedance of 400 to 50,000 ohms.

Get complete details by contacting your nearby Honeywell field engineer today. Minneapolis-Honeywell, Wayne and Windrim Avenues, Philadelphia 44, Pennsylvania. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

First in Control

SINCE 1885

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

Circle Service No. 3

THIS MONTH'S COVER

The theme of this issue of BRICK & CLAY RECORD is AutoClayMation, automation in the structural clay and related industries. Our cover shows a splendid example of an automated operation, the abrasives plant of the Norton Co. at Worcester, Mass. For more on AutoClayMation, see the section beginning on page 35.

A CAHNERS PUBLICATION

Brick & Clay RECORD

Contents for September, 1961 • Vol. 139, No. 3

35 AutoClayMation—Key to Industry Progress

In its annual AutoClayMation section, BRICK & CLAY RECORD presents 13 pages offering a representative selection of machinery and equipment designed to advance the industry toward the desired goal of complete automation with all its attendant benefits.

64 Depletion Bill Passes House

Culminating much intensive effort on the part of dedicated members of the industry, the House of Representatives has passed the bill upholding the industry's position on depletion. The next struggle is in the Senate.

66 What Do Raw Materials for Making Block Cost?

In the second in our series on ceramic block, our author speculates that the reluctance of clay products manufacturers to get into the block business may be due at least in part to a misunderstanding about raw material costs. A most revealing article.

69 How to Fast-Fire Kilns

Fast-firing of kilns can be brought about, but it is necessary to take certain steps to achieve it. Important among these is the taking of more and detailed measurements than are now generally being taken.

72 See Big Gains for Lightweight Aggregate

Enthusiastic forecasts that expanded clay and shale lightweight aggregates can look ahead to years of consistent and substantial growth highlighted the midyear meeting of the Expanded Clay and Shale Association.

Departments

23	Editorial	30	Refractory News
24	News of the Industry	83	Circle Service Card
29	SCPRF News	98	Classified Ads

Leading Clay Journal of The World
Established 1892; Now in 69th Year

The magazine of brick, drain tile, structural tile, clay aggregate, terra cotta, roofing tile, refractories, clay pipe, and abrasives.

J. J. SVEC
Editor and Publisher

Editorial

*FRED L. STEINHOFF, *Editorial Director*
KENNETH A. BRENT, *Senior Editor*
*NEAL MOHLER, *Managing Editor*
A. A. FERREIRA, *Associate Editor*
**Ceramic Engineering Staff*

Sales Offices

HOME OFFICE: *5 S. Wabash, Chicago 3, Ill. Franklin 2-6880: Floyd M. Burdick, Business Manager; J. B. Stringer, Sales Representative; Robert H. Mathews, Assistant Business Manager; Anne Anzak, Sales Assistant.*

NEW YORK: *Albert S. Robinson, Vice President; Harry H. Linden, 55 W. 42nd St., Room 300, NYC 36. Lackawanna 4-9662*

CLEVELAND: *Richard F. Burkhart, Room 702, The B. F. Keith Building, 1621 Euclid Ave., Prospect 1-1312*

SOUTHERN: *John M. Printup, 121 S. E. First St., Miami, Fla., Phone: Franklin 9-2668*

DALLAS: *R. W. "Whit" Jones, John Printup & Assoc., 906 Beechwood Drive, Richardson (Dallas) Tex., Phone: AD 5-2041*

CALIFORNIA: *Richard S. Meyer, 3137 Kelton Ave., Los Angeles 34*

PACIFIC NORTHWEST: *Frank J. McHugh, Jr., 520 S. W. 6th Ave., Portland 4, Oregon. Phone: CApital 6-2561. Also Seattle*

CONTRACTS: Formal acceptance made only in Chicago.

Business

M. J. SKODON, *Vice President in Charge of Manufacturing*
H. G. LOVE, *Circulation Director*

BRICK & CLAY RECORD is published monthly by Industrial Publications, Inc., 5 South Wabash Ave., Chicago 3, Ill. Second class postage paid at Chicago, Illinois and at additional mailing offices.

Subscriptions

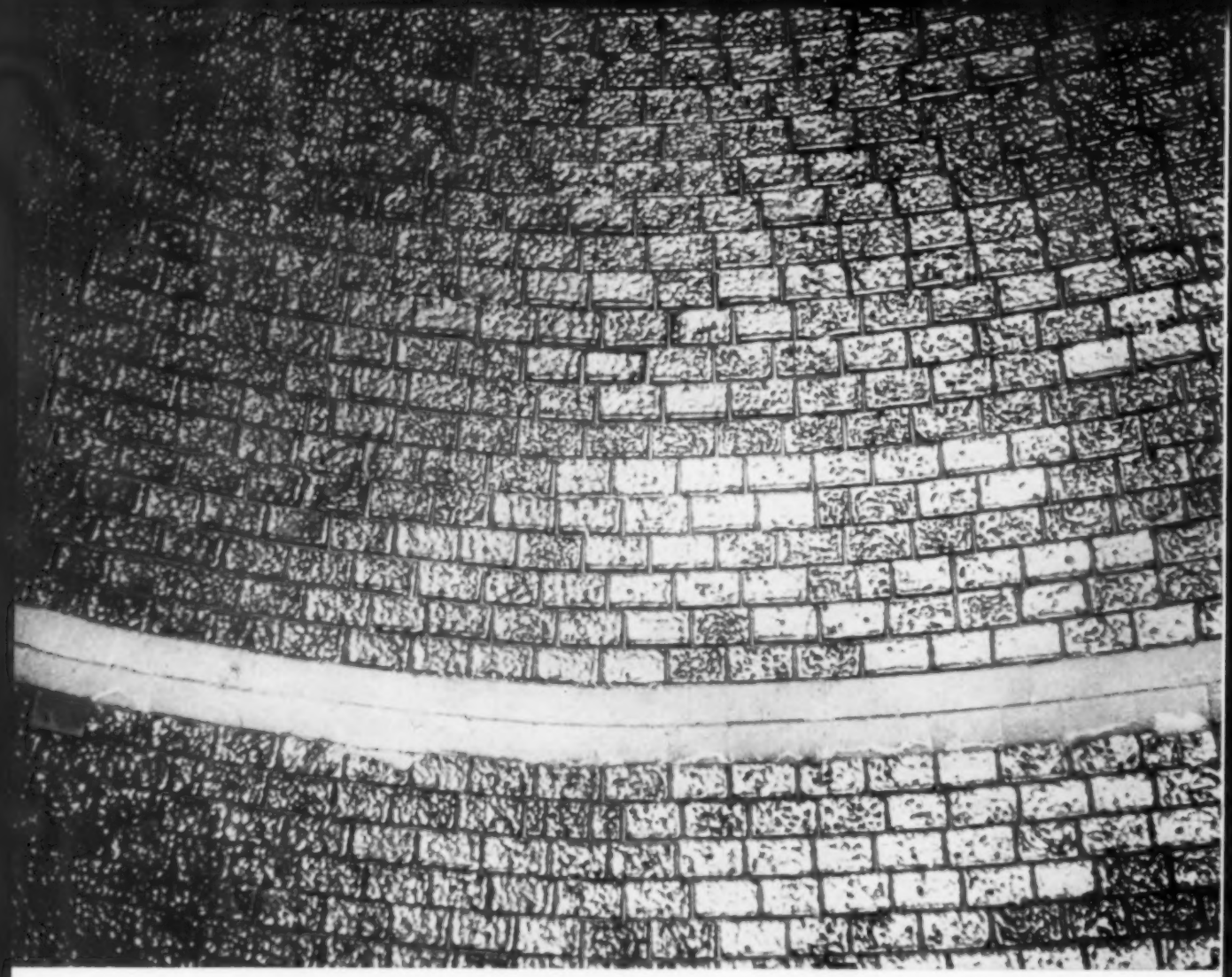
U.S.A. and Canada, $5.00 for One Year; $10.00 for Three Years. Single Copies (current issue) 75 cents, foreign $1. Single copy rates for back issues, $1. Foreign Rates, $7 per year; three years, $15.

Subscription Renewals

Forward all mail, including subscription renewals, changes of address (including new zone number, old address) orders for subscriptions, undeliverable copies, etc. to BRICK & CLAY RECORD, 5 South Wabash Ave., Chicago 3, Ill. Printed in U.S.A.

Published monthly and copyrighted 1961 by Industrial Publications, Inc., subsidiary of Cahners Publishing Co., Inc., 5 S. Wabash Ave., Chicago 3, Ill., U.S.A. Norman L. Cahners, Chairman of the Board; Maurice P. Driscoll, President; F. L. Steinhoff, Exec. Vice President & Treasurer; Saul Goldweitz, Vice President; F. J. Amstadter, Secretary.

BRICK AND CLAY RECORD is indexed by Engineering Index, Inc.



Who says there is no difference between insulating firebrick? This unretouched photograph shows two courses of B&W IFB in a salt glaze kiln crown built of competitive insulating firebrick. See how the competitive IFB have glazed after only five burns—clear proof there is no "or equal" for B&W Insulating Firebrick.

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

R639

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

For Accurate Heat Measurement

CHOOSE THE

BELL PYROMETRIC SYSTEM

All raw materials, pressing and firing characteristics are continuously controlled by many daily measurements.

New, Improved CONE PLAQUES

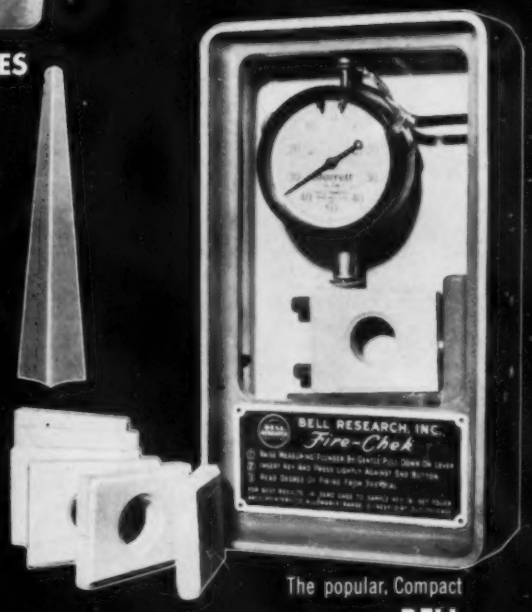
This plaque is center grooved to break squarely so it can be used as two or four hole plaques. You can now inventory one type plaque to serve a dual purpose.

PYROMETRIC CONES

The chief use of cones is to serve as a true guide to the end point of firing. They also are used for investigations of heat distribution in Kilns.

FIRE-CHEK KEYS

The simple use of these keys and gauge gives you a constant and reliable method of measuring the heat differential. These gauge readings keep you informed on poor firing areas in your Kiln.



The popular, Compact
BELL FIRE-CHEK GAUGE
A rugged and precise instrument

Send today for complete information

BELL RESEARCH, INC.

P. O. Box 757 E. Liverpool, Ohio

BELL OPERATIONS

Making Extra Dollars for Ceramic Customers—Since 1931

BELL MINERALS
Feldspar
W. Paris, Me.

BELL CLAY
Ball Clays
Gleason, Tenn.

BELL RESEARCH
Cones, Plaques & Keys

BELL KAOLIN
Kaolin
Batesburg, S. C.

SOUTHWESTERN TALC
Blen-Tex

Circle Service No. 5

← Circle Service No. 4

1 2 3 4 5 6 7 8 9 count to 10

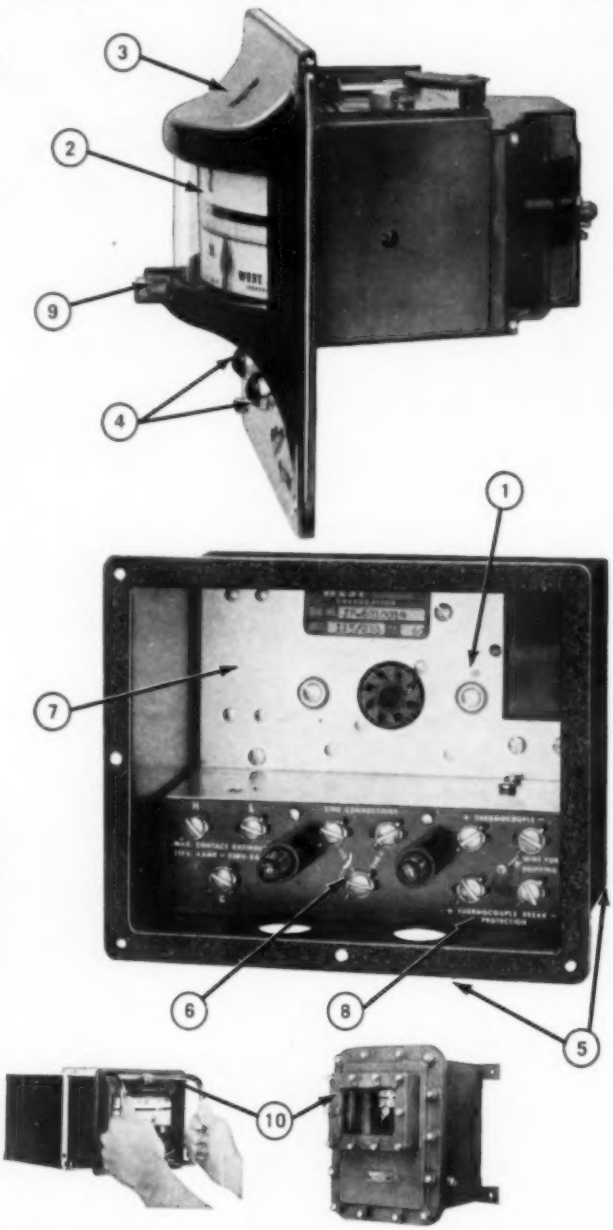
...and keep your temperature under control

ARE YOU GETTING ALL "BIG 10" ADVANTAGES IN YOUR TEMPERATURE CONTROLLERS?

(Use this check-list)

1. **No vacuum tubes**
   Solid-state. Free from warm-up, tuning and complicated circuitry.
2. **Full-time true temperature indication**
   Indicated on mirrored anti-parallax scale.
3. **Sealed plug-in meter unit**
   Dustproof. No special shipping case required.
4. **Two pilot lights**
   Indicate both heating and cooling.
5. **Compact size: 6¼" H x 7½" W**
   Mount more in less space.
6. **Provisions for optional wiring in every instrument**
   For 120, 240 or 208 volts — 50 or 60 cy. Wired from the front.
7. **Interchangeable control modes**
   Change chassis for off-on, proportioning, etc., control.
8. **Thermocouple break protection**
   In every instrument at no extra charge. Shuts off heat if thermocouple breaks or burns out.
9. **Protected temperature setting knob**
   Guarded against accidental movement.
10. **Optional instrument housings**
    Complete instrument plug-in or explosion housings available.

You get *all* of the "Big 10" advantages with *any* Gardsman controller by West, plus proved reliability and minimum maintenance . . . all at prices you'll find surprisingly low. Ask your West representative for full information. He's listed in the yellow pages. Or write direct for Bulletin COM.

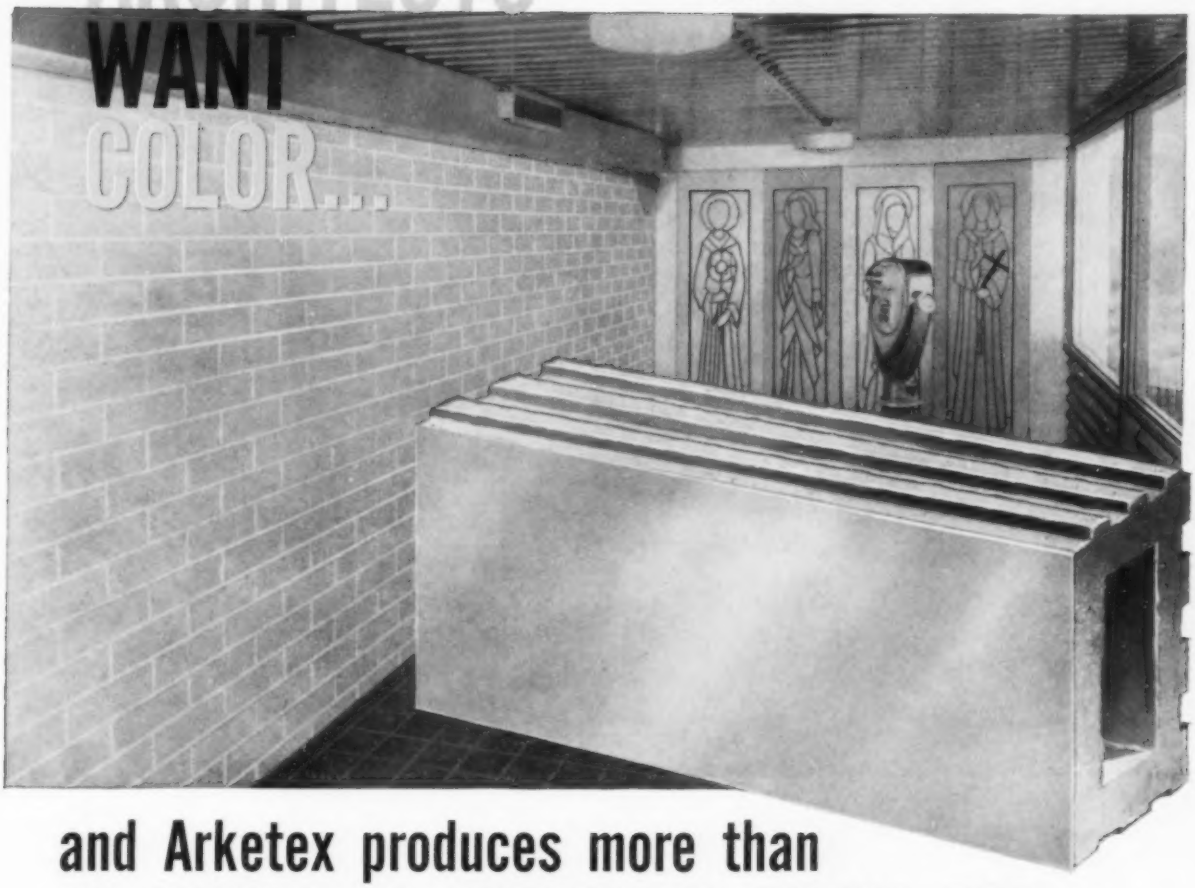


WEST *Instrument*
CORPORATION
SALES OFFICES IN PRINCIPAL CITIES
FACTORY AND GENERAL OFFICES:
4353D W. MONTROSE, CHICAGO 41, ILL.
BRITISH SUBSIDIARY:
WEST INSTRUMENT, LTD.
52 Regent St., Brighton 1, Sussex

Circle Service No. 6

ARKETEX CERAMIC GLAZED STRUCTURAL TILE in the observation tower of the Life and Casualty Insurance Company of Tennessee. Architect: Edwin A. Keeble Associates, Inc., Nashville, Tenn. General Contractor: J. A. Jones Construction Company, Charlotte, N. C. Masonry Contractor: Elliott and McIntosh, Nashville, Tenn.

ARCHITECTS WANT COLOR...



and Arketex produces more than 48 SHADES ON STRUCTURAL FACING TILE

Architects are specifying more and more ceramic glazed structural tile for economy reasons as well as for its aesthetic and psychologic values. Colorful, durable structural facing tile—like that made by Arketex Ceramic Corporation, Brazil, Indiana—creates completely finished load-bearing walls in a single construction operation. Arketex's full complement of shapes and sizes is produced in a rainbow of decorative and functional colors. The smooth, colorful glaze surface retains its beauty, reduces maintenance to infrequent washing.

Through the years Drakenfeld has been proud to meet Arketex's needs for many colors with glaze stains formulated to precisely repeatable specs. Whatever the scope of *your* present or future production plans in this expanding market, remember that Drakenfeld offers a variety of consistently uniform coloring materials—glaze stains, glaze specks, prepared glazes, sand colors, englobe stains—to suit practically every brick or tile processing setup. An experienced team of our ceramists will gladly discuss color application methods and give you prompt, reliable help on your coloring problems. We welcome your inquiry.

CALL ON **Drakenfeld** *YOUR PARTNER IN SOLVING COLOR PROBLEMS*

B. F. DRAKENFELD & CO., INC.

Executive Offices: **45 Park Place, New York 7, N. Y.**

Factory and Research Center: **Washington, Pa.**

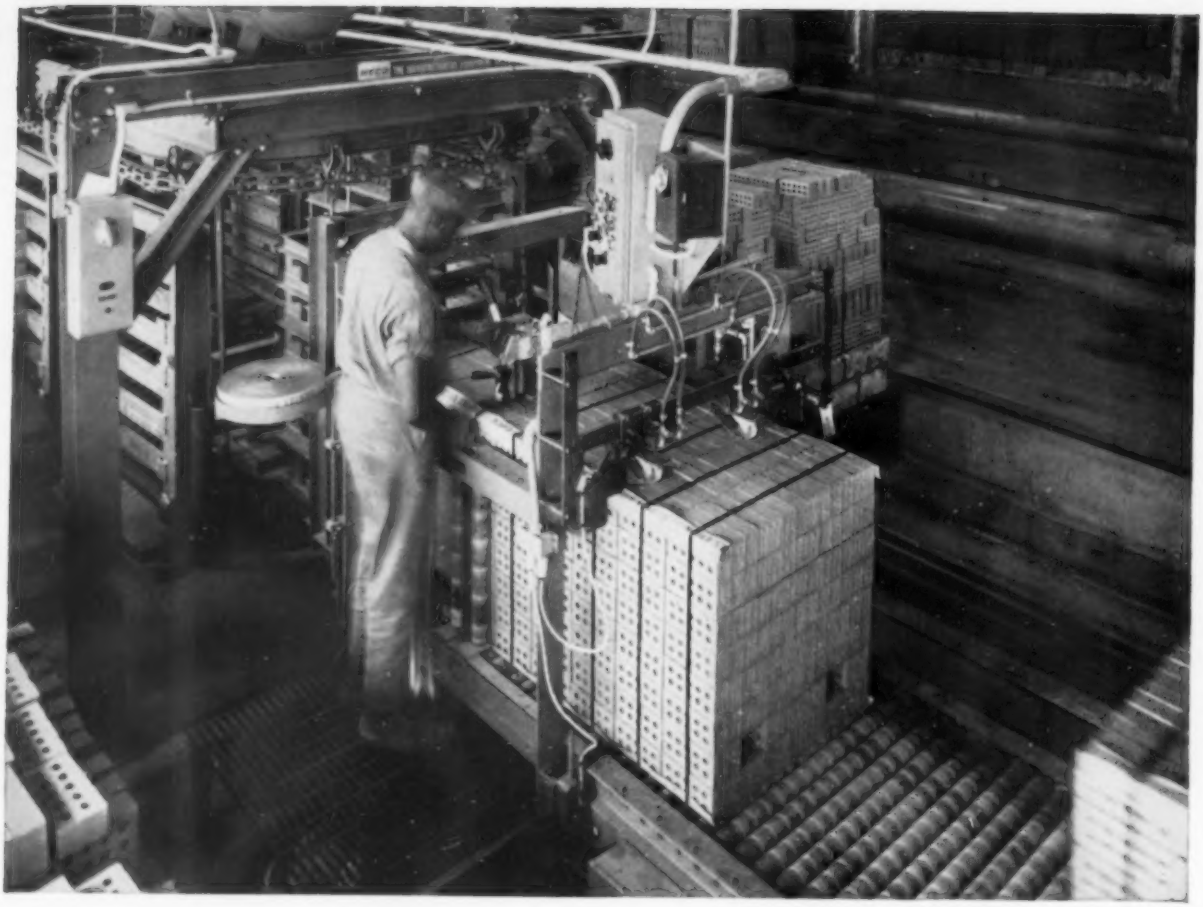
Pacific Coast Agents:

BRAUN CHEMICAL COMPANY, 1363 So. Bonnie Beach Place, LOS ANGELES 54, California, Phone: ANgelus 9-9311

BRAUN-KNECHT-HEIMANN COMPANY, 1400 Sixteenth Street, SAN FRANCISCO 19, California, Phone: HEmlock 1-8800

55-7

Circle Service No. 7



7 men blend, stack, and strap over 100,000 brick per shift

If you produce 60,000 or more brick per day in one plant and want them packaged at least cost, a Signode-MECO machine like this one at Columbia Brick and Tile Co., Columbia, S.C., will be of real interest. It offers many advantages over other volume brick packaging methods:

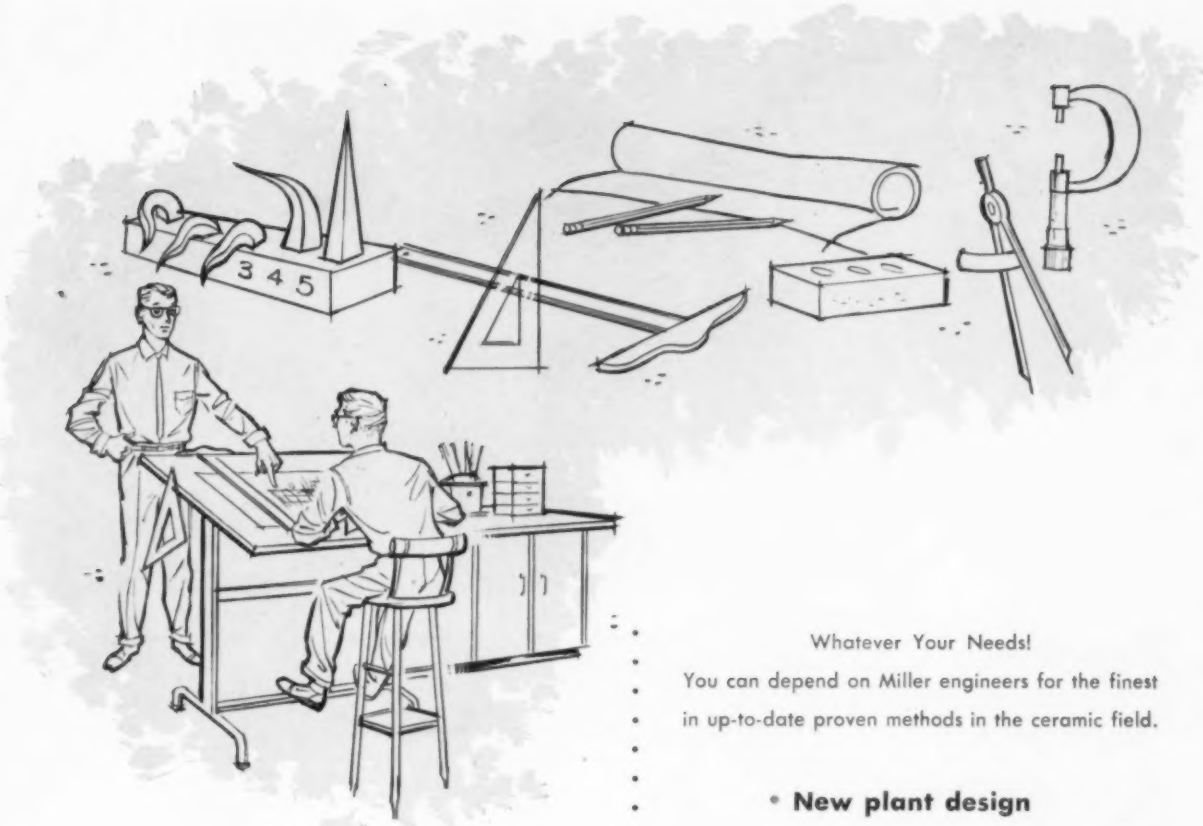
- the MECO conveyor system is designed to minimize lifting and reaching while the brick are blended and stacked.
- packs of 75 to 125 standard, Norman, or Roman brick are compacted by pneumatic rams to eliminate stacking voids and are then secured in a tight, steel-strapped package by a Signode pneumatic all-power AMP strapping machine used with a Signode power strap feeder.
- continuous paper corner protectors are automatically applied and cut off between multi-packs to speed lift truck handling. Take-off conveyor handles peak production surges without the constant attention of a lift truck driver.

Every Signode installation is custom engineered. Signode field engineering service and brick packaging tools and machines are available to make any production volume fast and efficient, whether you need more or less automation than at Columbia. Your inquiry is invited.

First in steel strapping

SIGNODE
STEEL STRAPPING CO.
2629 N. Western Avenue • Chicago 47, Illinois
Offices Coast to Coast, Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Circle Service No. 8



Look To Miller For The Finest Engineering Service And Plant Design

Miller engineers are specialists in solving problems for the ceramic and heavy clay products industry!

Miller engineers offer you the benefit of their valuable experience in plant design and expansion from layout to finished detail. Miller offers technical research, careful planning and knowledgeable engineering.

Whatever Your Needs!

You can depend on Miller engineers for the finest in up-to-date proven methods in the ceramic field.

- **New plant design**
- **Expansion and up-dating of present facilities**
- **Plant construction**
- **Kiln construction**
- **Production problems**
- **Material analysis**

For complete information without obligation, call, write or wire Miller Equipment Company.

Miller Equipment Company

P. O. Box 1566 • Phone ME 3-3541 • Salisbury, N. C.

Pacific Agent:
WALTER C. STOLL & SONS
5028 Alhambra Avenue
Los Angeles 32, California

Circle Service No. 9

IMPROVED DRY PANS & GRINDERS

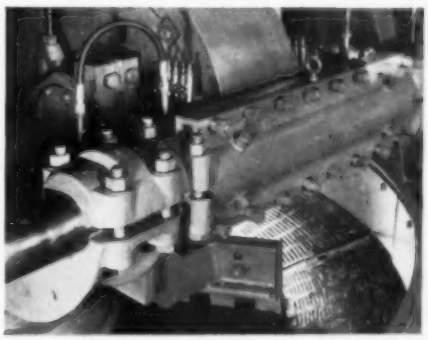
are our *business*

Over-all view of Chambers 10' Dry Pan with covers shows the accessibility and flexibility of Chambers' suspended design.

Below, right. (1) Tilted Ni-Hard screen plates give you real increases in productivity through their higher screening efficiency. Slower travel of the individual grains across the screens permits higher operating speeds and, hence, higher production. (2) Supporting arms of Ni-Hard screen plates are now steel, eliminating one more source of breakage. (3) The cake-breaking and deflecting plow, with its toothed Ni-Hard blade, is clearly shown in the center of the picture. Adjustment for vertical position, of course. (4) Muller yokes are now of solid steel, following our design philosophy that cast iron has no place in machines for brick, tile, sewer pipe, or refractories. (5) Clearly visible are our replaceable ⅝"-thick steel curb-liner plates.

EASY CONVERTIBILITY

While productivity and performance naturally came first in our program, we knew that you, our customers, would give priority also to convertibility, either way, from rim-discharge grinder to dry pan, and back. So we made both machines completely convertible in your plant, if desirable.



Above, left. (1) Our complete re-designing program included spacing the mullers farther apart, thus increasing their rotational speed and, consequently, the speed of flow of material through the grinding process. (2) 16"-face, 5"-thick Ni-Hard muller tires are designed for quick replacement by means of double wedges and locking thru-bolts. (3) New 2-piece plow design for adjustment across the face of the muller to even out abrasion patterns, with a swivel feature for changing the contour and flow of material into the muller path. (4) Note in lower right-hand corner of photo separate Ni-Hard-faced steel plow for breaking up materials that tend to cake, and for deflecting them to the screen area. (5) Two heavy-duty air cylinders per muller match exact grinding pressures to material characteristics and moisture content at the turn of a valve. (6) Adjustable lubricators operate from a centralized system to inject exact quantities of grease required for muller roller bearings and for vertical shaft and muller yoke bushings.

SERVING YOUR INDUSTRY FOR OVER 100 YEARS

CHAMBERS BROTHERS CO.

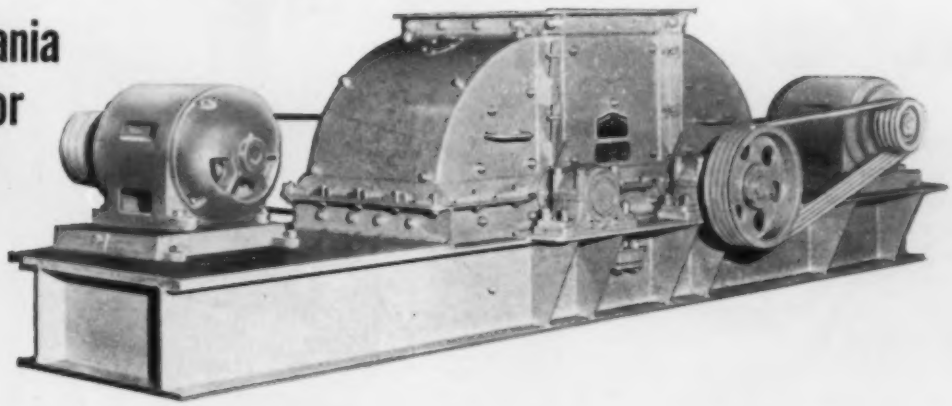
1857 1961

52nd & Media Streets · PHILADELPHIA 31, PA.

Circle Service No. 26

THERE'S A NEW AND BETTER CRUSHER FOR WET CLAY OR SHALE...

Pennsylvania Twin-Rotor Impactor



Now there is a crusher specially designed for efficient reduction of wet, sticky clays and shale, and other similar materials. The new Twin-Rotor Impactor produces a maximum of fines by impact crushing *exclusively*. No cage bars to plug. No excess power use through needless rubbing.

Even when loads are unusually sticky, crushing time is never lost by shutting down the Twin-Rotor Impactor to clean off adhering material. Instead, gas torches are played into spaces between the liners and the frame. Wet sticky materials do not cling to the hot liners but drop straight into the crushing path of the whirling hammers. Production continues at maximum capacity.

The Twin-Rotor Impactor performs best as a secondary crusher in brick and tile plants, but also has applications as a primary crusher and as a tailings reducer for maximum feed sizes to 8 inches. Rated capacities to 100 TPH of 100 percent minus 8 mesh product. Check these additional features:

- No cage bars—fewer parts to buy or maintain.
- Shipped complete with motors mounted on frame—easily and inexpensively installed.
- Runs without vibrating—does not require a massive, expensive concrete foundation.
- Quickly removable end covers provide access to all internal parts including bottom liners, for low cost, easy maintenance.

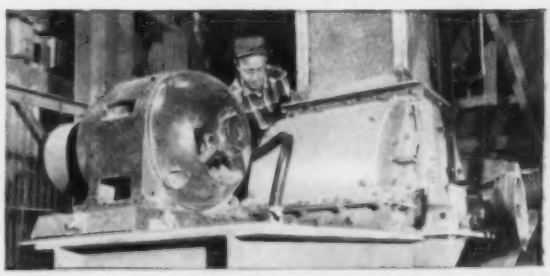
Rugged Bath-built construction coupled with other Pennsylvania features such as dust seals, renewable tip hammers and flexibility for desired product gradation provides an outstanding crusher—job-engineered for wet clays and shale.

FREE BULLETIN

Complete data on Twin-Rotor Impactors is available in Bulletin 6020. Send for your free copy today.

PENNSYLVANIA CRUSHER DIVISION

BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.



• New Pennsylvania Twin-Rotor Impactor installed at Triangle Brick Company plant, Durham, N. C.

PENNSYLVANIA CRUSHERS

BATH-BUILT

Circle Service No. 10

Pearne and Lacy

HYDRAULIC BLOCK PRESS

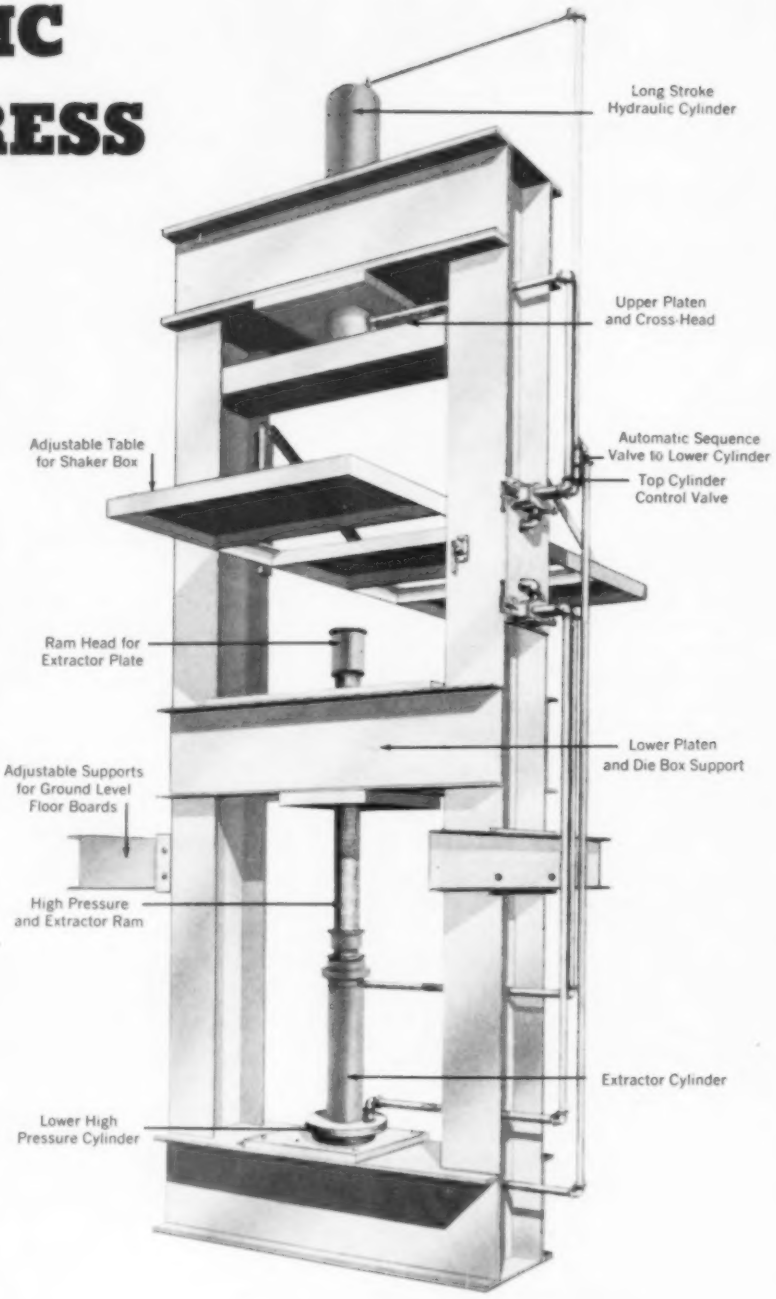
Model 1084

Designed primarily for the pressing of large slabs from dry material and the repressing of shapes from extruded material. These presses are available in both 70 ton and 127 ton capacity handling sizes up to 12″ x 36″ x 4″ thick.

OPERATION: The principal features provide (1) a rapid traverse to contact the work, (2) top and bottom pressure to insure uniform density.

After the main ram has pressed the material a bottom pressure is automatically applied by means of a lower cylinder. The pressed block is extracted from the bottom by means of an extractor cylinder. The pressure can be adjusted to give a predetermined pressure in either or both cylinders up to full capacity. A power shaker box is available for use with dry material.

CONSTRUCTION: The Pearne & Lacy Block Press is shipped complete with pumping unit and controls. The press frame is of heavy rugged construction. Piston rings are used in all cylinders and should last for life of machine.


Long Stroke Hydraulic Cylinder
Upper Platen and Cross-Head
Adjustable Table for Shaker Box
Automatic Sequence Valve to Lower Cylinder
Top Cylinder Control Valve
Ram Head for Extractor Plate
Lower Platen and Die Box Support
Adjustable Supports for Ground Level Floor Boards
High Pressure and Extractor Ram
Extractor Cylinder
Lower High Pressure Cylinder

Write for complete operation details.

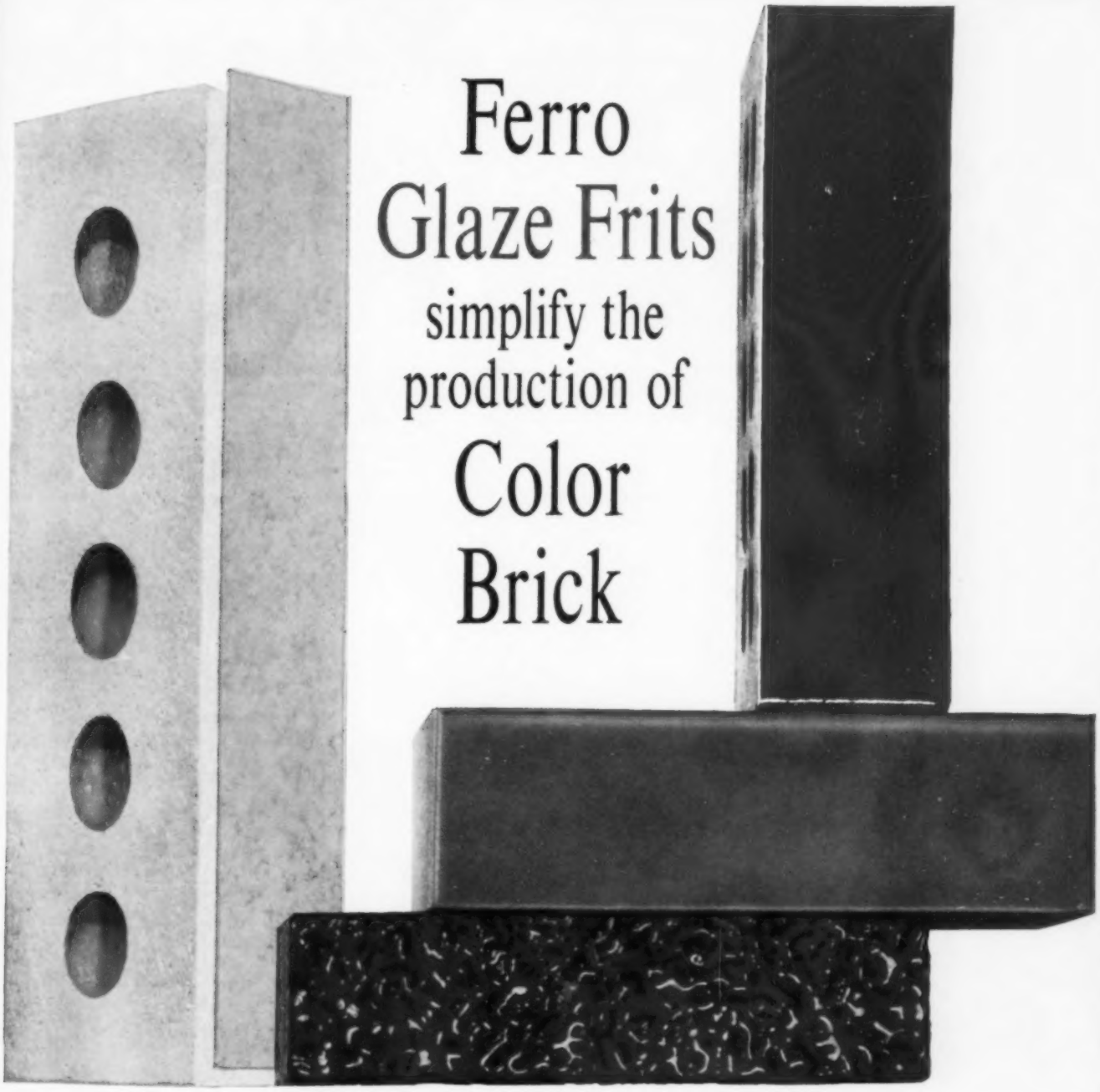
Engineers and Manufacturers of Automatic Handling and Finishing Equipment for the Ceramic Industry.

P.O. Box 3366, Terminal Annex,
Los Angeles 54, California Phone: CU 3-1268

Eastern Representative
Dwight B. Hendryx, 6621 Darlington Rd., Pittsburgh, Pa.

Circle Service No. 11

PEARNE AND LACY INC. MACHINE COMPANY



Ferro Glaze Frits simplify the production of Color Brick

Trouble-free production of glazed color brick, and particularly of *low-temperature reds*, is highly dependent on the glaze-frits that are used. On their "clear glass" quality, their workability, their uniformity in production, and especially their *compatibility* with the inorganic colorants required to best provide the colors desired. ■ That there is a big difference in glaze-frits, many producers have discovered. And they find this difference can mean better production, consistently higher quality, in their brick-making operations. ■ Ferro produces glaze-frits for all body materials — fire clay, shale, clay grog and lightweight aggregates. They work well in all colors, in cleanable matte or high gloss finishes. You'll find it profitable to *try* them.

FERRO

FERRO CORPORATION

Cleveland 5, Ohio . . . Nashville 11, Tennessee . . . Los Angeles 22, California

Circle Service No. 12

How would you like

$2000 PROFIT

Sounds fantastic . . . but it's true! If you use equipment to *pull, push, dig, lift* or *load*, you can save up to $2000, in just the time it takes to sign your name on an order for a new Case industrial tractor.

That means you make a handsome profit *before the equipment moves an inch.*

Certainly price alone isn't reason enough for you to buy *any* working tool for your business. But here, in Case machines, you also know you're getting premium quality, a fine record of performance, that insures you an extra return on your investment every day it works for you.

You'd be wise to go into details with your Case dealer *now.*

Here's the Case deal in a nutshell: a better price to start with . . . quality beyond question . . . performance that speeds up your production. All good reasons for you to check into the outstanding buying opportunity you have **right now.**

It's "PROFIT PICKIN' TIME" NOW

to pick up

IN 7 SECONDS?

SAVINGS UP TO

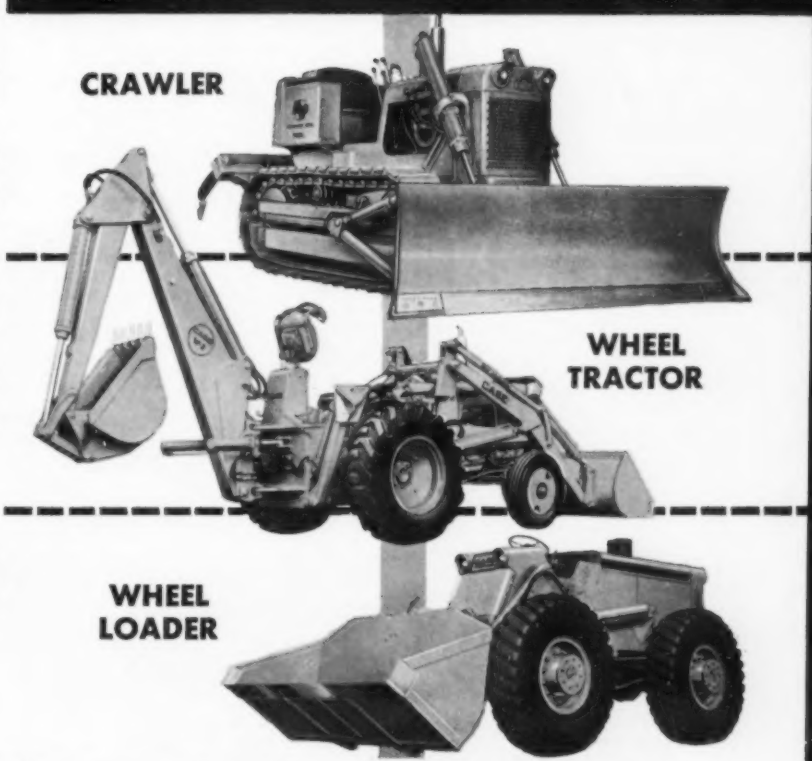
It's a fact that these savings are *especially* impressive when you consider the unusual advanced features that help give Case equipment its outstanding superiority. Here are a few:

- **Case crawlers with exclusive Terramatic® Transmission speed up the pace of production, help insure a better margin of profit on close-bid jobs. And better performance holds for every job after that for years to come.**
- **Operator comfort, extra safety factors and the utter simplicity of control provide additional bonus benefits. Matchless work visibility too, adds to operator productivity.**
- **You can get proof before you invest a cent. Just ask for a Case demonstration test. See any piece of Case industrial equipment do a better job faster, right before your eyes.**

ASK FOR A DEMONSTRATION NOW!

Your Case dealer needs only a call from you, an idea of the equipment you need. He'll set up a demonstration to prove every point we make. And then he'll quote you a deal no cost-conscious businessman could resist!

3 BASIC TYPES AVAILABLE...



Plus a multitude of combinations

at all **CASE**® INDUSTRIAL DEALERS

Circle Service No. 13

What can **FAST FIRING** & **PEMCO** mean to YOU?

Everywhere they're tried, fast fire pilot installations show amazing possibilities for ceramic manufacturers. These installations hold promise of higher production rates and fewer defects, with resulting savings on labor and fuel lowering unit costs. In addition, fast fire equipment of modern design takes less floor space and is a basic step in developing a fully automated production line.

If you've been considering a fast fire process, talk to Pemco for experienced advice on suitable glazes. Pemco can offer you already proven formulas in white or colors or will work closely with your suppliers of body materials and equipment to develop a glaze specifically to meet your needs.

**Write for a copy of "Fast Fire Glazes",
a recent talk presented to the OCIA by John Marquis.
Pemco Corporation, Baltimore 24, Md.**

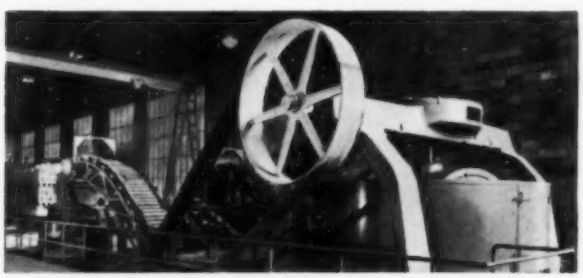
RESEARCH AND A FLAME **PEMCO**® BALTIMORE 24, MARYLAND

Ceramic frits, inorganic pigments, vitrifiable glass colors

Circle Service No. 14

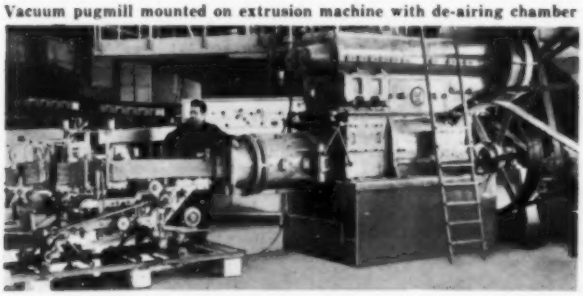
RIETERWERKE INTERNATIONAL PLANNERS & BUILDERS, DESIGN AND INSTALL COMPLETE PLANTS FOR HEAVY CLAY PRODUCTS

We have planned, designed, built and equipped brick, roofing tile, refractory clay and stoneware products plants all over the world. Our high-production machinery is precision-built to operate smoothly with clay mixes of from medium to heavy moisture content, from about 16% relative wet weight to 25%. Each piece of equipment has been integrally designed for maximum output, minimum maintenance. Machinery is protected from dirt and dust by streamlined housing wherever feasible, and is engineered for maximum noise reduction. All steel parts and castings produced under rigid quality control inspection in our own foundries.



Edgerunner with overhead drive for wet pan grinding and mixing

Vacuum pugmill mounted on extrusion machine with de-airing chamber

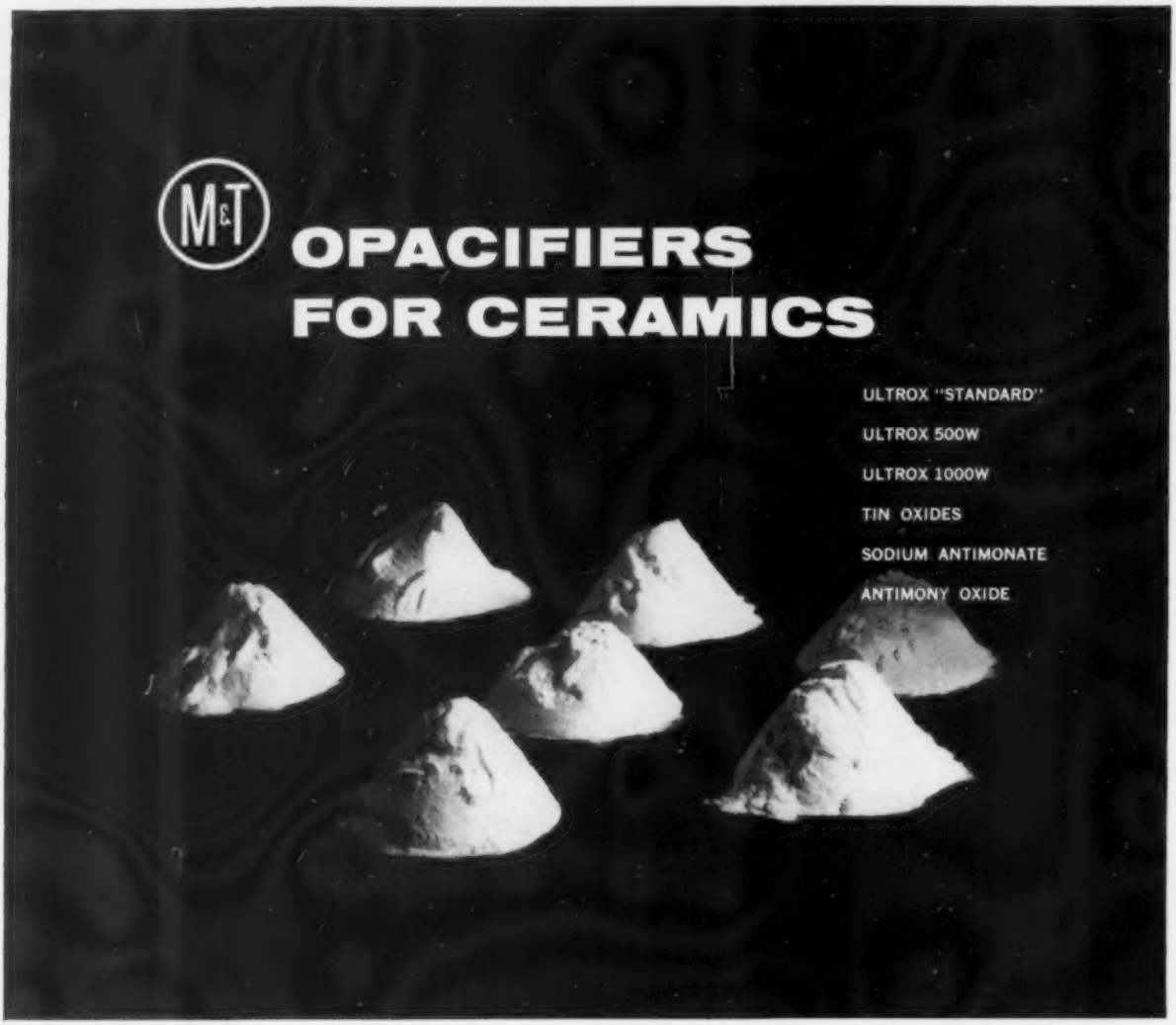


RIETER machinery for heavy clay products includes: Vacuum Pugmills/Extrusion Machinery/Edgerunners/Box Type Belt Feeders/Slat Conveyors/Circular Screen Feeders/ Pipe Presses/Roll Crushers/Twin-Shaft Mixers/Rotary Batchers and Mixers/De-Airing Units/Piston-Type and Water-Ring Vacuum Pumps/Tempering Silos and others.

RIETERWERKE,
Dipl.-Ing. Walter Händle
Konstanz, West Germany

For literature and technical information, write to U.S. Agents: GEORG VON OPEL CORP., 15 William Street, New York 5, N.Y. • BO 9-5690

Circle Service No. 17



Brick and structural tile glazes improved 2 ways with ULTROX®

An unusual combination of uniformity and "latitude" is provided by ULTROX "Standard" Zirconium Opacifier because its particle size range is rigidly controlled and tailored to give excellent performance in colored glazes. Covering power is developed with maximum opacifier economy, while less stain is needed to obtain color strength. Glazes made with ULTROX "Standard" also tolerate minor variations in plant production techniques—maintaining uniform opacity and shade. This *production latitude*, another result of optimum-particle-size control, is particularly important in assuring uniform product quality in day-to-day production of glazed structural tile, glazed brick and similar ceramic products.

For strong whites or "fussy" pastels, ULTROX 500W is recommended—and, when needed, ULTROX 1000W delivers the maximum in white reflectance.

M&T Chemicals

METAL & THERMIT CORPORATION
Rahway, New Jersey
In Canada: M&T Products of Canada Ltd., Rexdale, Ont.

Circle Service No. 16

Circle Service No. 15 ⟶

...ANY TOWMOTOR-GERLINGER TRUCK

TOWMOTOR'S ON THE MOVE—saving money, manhours and maintenance for fork lift truck users—through four special Towmotor Finance Plans. (1) Time Payment Plan enables you to buy new equipment through monthly payments tailored to specific needs. (2) Leasing Plan enables you to lease new equipment for periods up to 5 years with renewal option. (3) Leasing Plan with Purchase Option at end of lease period. (4) Renting new equipment for a period of several months or as long as equipment is needed. Towmotor supervised maintenance can be included on all Towmotor fork lift trucks —made only by TOWMOTOR CORPORATION, CLEVELAND 12, OHIO.

TOWMOTOR® THE ONE-MAN-GANG — GERLINGER*

*Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

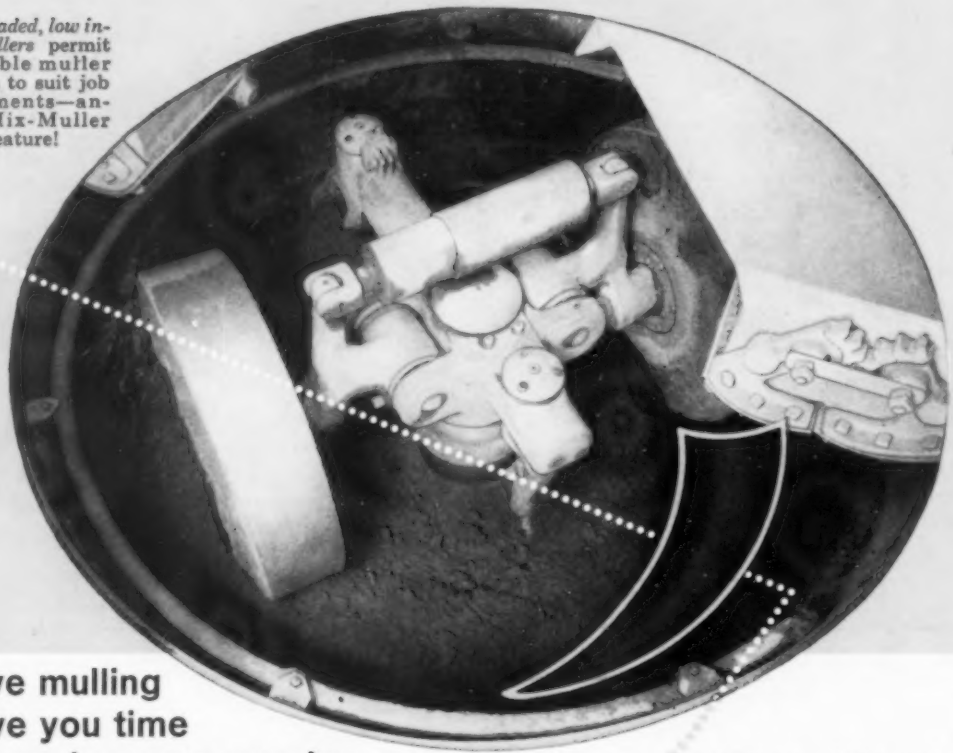
...OR ANY CARRIER

Gerlinger Material Carrier • Model 40-SH

MIX-MULLER®

CONTROLLED DISPERSION FOR HEAVY PRODUCTS

Spring loaded, low inertia mullers permit adjustable muller pressures to suit job requirements—another Mix-Muller control feature!



P-360-R

Intensive mulling can save you time and expensive reprocessing

The Simpson Mix-Muller is specifically designed to put *you* in control of mixed properties. In this era of expensive, high purity materials such a machine can, in one operation, help you eliminate reprocessing, remixing and slash waste and rejects simply by making the *most* of prepared ingredients.

For these reasons, the rapid increase in the use of the Simpson Mix-Muller has paralleled the increasing availability of better, more uniform and more *expensive* raw materials.

For similar reasons . . . Mix-Muller usage has paralleled a new, enlightened attitude on mixing practice among processors who have learned that careful attention to mixing operations can be their most important source for *savings*.

Can you *afford* to settle for less than controlled dispersion?

See our advertisement: CHEMICAL ENGINEERING CATALOG

SIMPSON *MIX-MULLER*® DIVISION

National Engineering Company

654 Machinery Hall Bldg. • Chicago, Illinois

3 way mulling action saves material, coats each grain

. . . KNEADING

Because the mullers never touch the wearplate, you get an intensive kneading of the muller against material grains—through a deep bed of material.

. . . SMEARING

The inside edges of the wheel have a shorter distance to travel than the outside edges to provide a smearing action—across the wide face of the mullers.

SPATULATE ACTION

...Note that mullers are set slightly off true radius so that as they roll they also skid sidewards to provide a spatulate action.

. . . THIS IS CONTROLLED DISPERSION

WRITE FOR HANDBOOK

—on mulling. 12-page bulletin explains controlled dispersion—gives details on 9 Mix-Muller models (¾ to 60 cu. ft. batch capacity).

Circle Service No. 39

Here's What Research Has Done for You

It is a good idea periodically to take stock of projects and undertakings lest we forget the good that has come out of them. In this second of the series of editorials on research we looked back over the 10 years of the Structural Clay Products Research Foundation operations, and are rather pleased with the results.

Probably the most well known and widely accepted accomplishment of the Research Foundation has been the "SCR masonry process".* The implication of that "process" is far reaching. In the first place it makes the mason and clay masonry competitive with many other building materials. Secondly, bringing into the business of bricklaying modern techniques lift the art of bricklaying from the age old 6000-year trade to a modern technical building process. No longer can bricklaying be relegated to the ancient past, but stands up alongside of all the modern applications of materials to construction.

Thirdly, the "masonry process" has not only killed the fable of limited production but has given the mason a tool by which he can increase his productivity and thereby kill the fable of limited production. The "masonry process" makes it possible for the bricklayer to put in the wall 50 to over 100% more units with actually less fatigue. The adoption of the "process" is spreading rapidly. As of this writing, over 700 cities in 37 states have adopted the "masonry process". This does not say that it's widely practiced in all the cities, but the door is wide open for the adoption of the system by the contractors. The masons have given it the go-ahead for residential construction only at the present time and now it is up to the contractors to put it to work. Besides so many cities in the United States, the "process" is being used in Canada, New Zealand and Australia.

The best example of the "masonry process" at work is Milwaukee, Wisconsin where 70% of the mason contractors in the residential field are using it.

It is reported that 1500 sets of the corner poles have been sold over a period of 2 years by one manufacturer for $500,000. This speaks well for the wide use of the process.

How successful it is can well be remembered by the Rockford-Milwaukee story. In Milwaukee with a 20% increase in labor scale and a five to 10% increase in the price of brick over a period of 6 years, the price of brick per thousand in the wall dropped 20% and the number of houses built of brick increased from 30 to 60% of the total market. In Rockford where the "process" was not in use, the same increases in labor and materials took place and to compensate for it the cost per thousand brick in the wall went up 20% over the same period. The number of houses built of brick rose from 25 to 35% of the total market.

From these Milwaukee figures it can be estimated that an extra 25,000,000 brick have been sold in Milwaukee alone because of the "process." This, at the going rate, is over $1,000,000. If the "process" was used only in the bigger cities, i.e., Milwaukee and larger, the sales figure could be $175,000,000.

It is obvious, therefore, that Milwaukee alone paid for two years of research in extra brick sold. It paid for two of the 10 years that research has been in existence.

But that is not all. The "SCR brick"** has also been a very important development of the research foundation. So far over 20,000,000 "SCR brick" have been sold. The profit from these 20,000,000 brick, before taxes, amounts to about $4,000,000 at least. The $4,000,000 would pay for the entire research program over the entire 10 years, let alone the two that came from Milwaukee's experience. The 20,000,000 SCR brick also relieved the pressure on the regular 8" brick. Competition was lessened as well as pressure on prices.

Does research pay off? And to think, only 40 out of the 500 large manufacturers took advantage of "SCR brick". These 40 alone earned, before taxes, all the expenses of research in the industry.

Need we go further? We have paid for the research program in just two developments and there are scores and scores of others that are just as important but possibly cannot be evaluated in dollars and cents at this time. There are many projects in the minds of the researchers, on the books and untried which will net the same in profits in dollars and cents and in prestige.

I believe that we can very well say here that yesterday's research is today's product. Today's research is tomorrow's product. Research is producing and credit should be given where credit is due. We are prone to forget the good and these good developments really paid off. What about their future? Will they continue to pay off? The answer is obvious: Yes, and many more times than they have done to date. And the industry has scores of other projects to apply right now and to look forward to in the years ahead.

*Reg. T.M., Pat. Pend., SCPRF

**Reg U.S. Pat. Off., Pat. Pend., SCPRF

J. J. Shea

Editor & Publisher

NEWS OF THE INDUSTRY

Research Theme for SCPI Convention

SCPI President Paul B. Belden, Jr., right, and SCPI Secretary J. J. Cermak, seen here at the board of directors meeting, have the important job of planning the 1961 annual SCPI convention to be held in Washington, D. C., November 6 to 8. Cermak, who is convention director, is currently making arrangements for the meeting. President Belden will preside over convention business sessions.

Industry research will keynote the 1961 annual convention of the Structural Clay Products Institute, to be held at the Shoreham Hotel, Washington, D. C., November 6-8, SCPI Board Chairman Douglas Whitlock announced.

The 3-day meeting will host an expected 800 clay products manufacturers, dealers, distributors and suppliers who will hear reports on research as well as technical, promotional and educational activities of the brick and tile industry. A list of speakers representing the brick industry, labor, mason contractors, architects and other building materials makers will be announced soon.

Business sessions include a meeting of the SCPI board of directors on November 4 and general convention meetings on November 6 and 7. In other business, officers and members of the board of directors of SCPI and the Structural Clay Products Research Foundation will be elected.

One of the convention highlights will be the banquet and president's reception on November 7.

During the 3-day period, the National Association of Distributors and Dealers of Structural Clay Products will hold its annual meeting and election at the Shoreham.

SCPI Secretary J. J. Cermak is the convention director.

General Shale Promotes

General Shale Products Corp., Johnson City, Tenn., announced the promotion of L. E. (Red) Ross to the position of assistant sales manager. Ross was formerly sales supervisor of the General Shale plant, Coral Ridge Brick and Tile Corp., at Fairdale, Ky. The new sales supervisor for Coral Ridge is J. B. (Jake) Kibler.

College Fund Contributor

The Larson Clay Pipe Co. has been cited as a contributor to the Ohio Foundation of Independent Colleges.

Dr. Harold K. Schellenger, executive director of the foundation said the Larson contribution was part of $1,001,022 contributed within the last year. The amount was donated by a total of 1,282 firms.

Norton in Stock Plan

Norton Co. is studying ways and means of creating a public market for its stock. A new employee stock purchase plan is also under active consideration.

Milton P. Higgins, Chairman of the Board made the following statement: "Today the majority of Norton stock is held by the descendants of the original founders or in trust for the benefit of their families. A number of these desendants are still in the active management of the company and most of the large stockholders are represented on our Board of Directors. To date Norton stock has not been made available to the general public.

"In creating such a market, it may become advisable for some of the large stockholders to sell a very small percentage of their stock. In any event there will be no change in the management of the company or employee relations."

New Elliptical Pipe

One of the first Tampa Bay area installations of elliptical pipe was made on the storm sewer line, on the south side of St. Petersburg, in Florida. The double line of 3,000 linear feet of pipe was a 6-week project.

The 38 by 60-inch shape (48-inch round equivalent) was manufactured by American-Marietta Co., Marietta, Ohio.

Known as Lo-Hed, elliptical pipe is for areas where cover is light and depth shallow. It has greater flow potential than its round equivalent.

Cites Manpower Need

The construction industry of the 1960's will see unparalleled growth, but only if apprenticeship training programs meet the rising demands for skilled manpower. This warning was sounded by board chairman Douglas Whitlock of SCPI, when he spoke to key men in industry, labor, and federal and state governments and vocational education at recent apprenticeship conferences in Kansas and Vermont.

He told the nine-state 17th Annual Eastern Seaboard Apprenticeship Conference that the coming population exposition with its demands for

more homes, schools, offices and industrial plants will not necessarily give any geographical area a construction boom in the 1960's unless there is some serious thinking and planning for apprenticeship training right now.

"Training the type of highly skilled craftsmen needed for today's technical construction took time and there is no substitute for it," he stated.

New SCPI Members

The newest members of the SCPI team are the Watkins Brick Co., Birmingham Ala., and the Westfield Clay Products Co., Westfield Mass. SCPI board chairman Douglas Whitlock extended the industry's welcome to Watkins' president Arthur Watkins and Westfield's president George Saphory.

Mr. Whitlock declared "We salute these two clay products firms as they join with other progressive brick and tile makers in our cooperative effort to capture a large share of the market of the 1960's."

650 at Logan Outing

A total of 650 guests registered at the recent annual outing for friends and customers of the Logan Clay Products Co., Logan, Ohio.

Included were officials, salesmen of construction firms, dealers, government officials, newspapers and government officials. All attendance records were broken.

Highlight of the outing was a golfing competition where 340 golfers, participated for prizes offered by Logan Clay.

A buffet dinner followed by entertainment presented by professional groups booked out of Columbus.

Fire Razes Building

A morning fire at El Dorado Brick Co., El Dorado, Ark. destroyed a brick and corruguated iron building housing a drying room and damaged two pieces of heavy equipment.

Damages were conservatively set at several thousand dollars but the owners of the company declined to make an estimate of the damages pending a determination of damages to brick mold and another section of machinery used in the manufacture of brick. However, brick destroyed in the blaze were believed to have been worth at least $5,000. Firemen brought the blaze under control in about three hours.

Dividends Postponed

Citing constantly rising costs of manufacture without correspondingly increased prices, together with the need to conserve funds for plant improvements which will increase efficiency and lower costs, the board of directors of Natco Corp., Pittsburgh, Pa., decided at its regular monthly meeting today to take no action on the common stock dividend, which normally would be paid October 1.

Cash dividends of 20 cents each have been paid this year on January 3, April 3, and July 3,.

"The company's operation for the year thus far are in the black," said Rod Shipley, Natco president, "after a losing first quarter which was largely due to adverse weather conditions throughout our sales territory. We expect to continue in a profitable position for the rest of the year. Our industry's greatest need is to get more realistic prices for our products, to balance the wage increases and other increased costs which have developed during the last year."

Elected President

J. J. Coffet of Cooksville-Laprairie Brick Co., Cooksville, Ont., Canada, was recently elected president of the newly formed Clay Brick & Tile Institute. The institute promotes greater use and understanding of structural clay products.

Fortune Sees Boom

Fortune magazine predicts a "superboom" in our economy. They believe that 1961 and 1962 will turn out to be two of the "best years ever" for the American economy.

However, they see only one fly in the economic ointment—no hope for genuine "full employment" in the forseeable future, only the probability that by the end of 1962 there should be enough jobs to get the unemployment rate down to a "normal" 4%.

Construction, *Fortune* believes,

(*Continued on page* 26)

'Big Wheel' Plus Horse Equals Pugmill!

This "big wheel," 6 feet in diameter, was used 75 years ago in the pugmill at Ferdinand, Ind. Ferdinand Woerter, shown by wheel, worked in the brick yard as a young man. A horse, walking in a circle, furnished motive power for the pugmill. Ferdinand is in Dubois County, Indiana, where several important deposits of clays have been found.

(*Continued from page 25*)

will continue to rise, with home-building reaching a 1,400,000 unit rate by the end of 1962. Other areas of construction are high and going up. Prices are likely to stay fairly steady, but wages may rise soon. Spendable personal income will advance in the next 18 months; personal savings may not increase, but are already at a high rate. Consumer spending is expected to increase at a rate of 6% a year.

Imports will rise as business booms but short-term capital is likely to flow to this country at the same time, so the net balance of payments will not change materially.

Finally, the forecast for credit is for no sharp changes in interest rates soon.

Storm Causes Fire

Fire set by lightning destroyed the U. S. Brick Co., manufacturing building a mile south of Tell City, Indiana, recently.

The 40,000 square foot building nearly all of brick and steel construction, housed the machinery and boiler of the plant which made face brick, facing tile, and common brick. It employed 25 persons and had a capacity of 40,000 brick a day.

Safety Awards Won

A Roanoke brick company has won a traffic safety award offered by the Virginia Highway Users Assn. The winner is Webster Brick Co., Roanoke, Va.

Webster's trucks traveled 772,008 miles last year with an accident frequency of .26 per 100,000 miles. This record earned the company first place in general and special commodity carriers competition.

Dickey Prospects Bright

With the following months assured of heavy shipping schedules due to the big backlog of orders, W. S. Dickey Clay Mfg. Co. will set a net sales peak, in the current fiscal year ending October 31, according to H. P. Wilhelmsen, president.

The current backlog of unfilled orders is equal to maximum production of all plants for the next three months and is comparable with the orders on hand at this time last year, he said. He termed prospects of the company as "very favorable" for the balance of the year.

Despite the abnormal rains which interfered with outside construction and operations, business in the past three months held above the 1960 levels.

Purchase Clay Firm

Alii Enterprises, Honolulu, Hawaii, has purchased GasprO's clay business and is now the states only supplier of brick and clay products, according to Raymond Proctor, president.

Alii was organized early this year and in February acquired Wilsonite Tile Co.

The company now has the only two deposits on the island, Proctor said. One is at Waimanalo, leased from the state, and the other is at Kaneohe, formerly owned by GasprO.

Use Clay Insulation in Old Indiana House

When weatherboard was removed from this 150-year-old house in Vincennes, Ind., nogging used by pioneers to insulate their homes was exposed. The builders of the house notched the studding to accommodate wooden spanners which were wrapped with straw and smeared with wet clay before being driven in place. After all spanners were in place, they were packed with wet clay and the weatherboard nailed on immediately.

Consider Stock Issue

Atlas Tile and Brick Co., Shuqualak, Miss., stockholders heard a report recently on operations of the company and considered the issuance of additional capital stock.

It was pointed out that the company is now operating on a profitable basis and that shipments in May exceeded a million and a half brick.

Atlas Tile and Brick Co., was acquired in February of this year by Mississippi Industries, and thereafter, some 1,100 acres of claybearing lands in Noxubee and Kemper counties were leased.

New Rockford Building

The Rockford Brick and Tile Co., Rockford, Iowa, has started excavation for 17,000 square feet of an Armco, fully insulated steel building which will house a new millroom and storage tracks for tunnel kilns. Building of the new tunnel kiln dryers will start the first of September.

By November 1 they will have the second phase of their expansion program, which will include direct set-

ting from the pug mill to the tunnel kiln cars. Production will actually be doubled, because they will have enough dryer capacity to operate both tunnel kilns and periodics at full blast. This expansion program will cost Rockford Brick Co. $150,000.

Empire Clay Feted

Having made good, steady progress in its first two years of operation, Empire Clay Products, Inc., Trinidad, Colo., is launched upon a third year of production and sales with an optimistic outlook, according to Willard G. Robinson. The firm's story was featured in a recent issue of the Trinidad *Chronicle News*.

Although presently operating at only 75% of capacity, Empire is producing about 750,000 brick monthly and has 53 individuals on the payroll which averages about $15,000 monthly at present and which totaled $130,000 in 1960.

New Acme Controller

John F. Cox of Dallas has been named senior financial officer and controller from Acme Brick Co., in a move designed to strengthen the financial department of the firm, which has headquarters here. Cox, a native of Utica, N. Y., was formerly with Dresser Industries at Dallas since 1954, as assistant controller.

Brick Pylons at Fair

Twin pylons, 40 feet tall, will support the North Carolina Trade Fair Insignia in front of the Coliseum when the state sponsored event opens Oct. 12.

A spokesman for Brick and Tile Service of Greensboro, which represents Tar Heel clay brick manufacturers, said the design has been worked out for the pylons. They will be constructed of reinforced brick donated by the manufacturers.

From a side view the pylons will be only 16 inches thick. From the front, however, they will taper from a seven-foot width at the base to a foot and a half width at the top.

Although the seven-foot-wide bases will be only two feet apart, the tapering will enable an insignia of seven feet in diameter to be suspended between the pylons 40 feet in the air.

At the present time four sizes and seven kinds of brick are being produced at the Empire plant. The sizes included modular, engineers, Norman and Roman and of the different kinds, one of the newest and most popular is called "autumn blend" which is typical of the autumn colors in the western mountains.

Seven kilns are being operated at the Empire plant and Robinson describes production as up 30% over this time last year.

Tags Hail North Carolina As 'Brick Capital'

Jack Glass and Marion Cochran, engineers with Brick & Tile Service, Inc., Greensboro, N. C., look over new tags used by Tar Heel brick manufacturers to focus attention on North Carolina's position in the brick industry. The state produces about 10% of the nation's brick.

Brickmaker Dies in Crash

J. Henry (Harry) Cunningham and his wife, Margaret, of Lexington, N. C. were killed on August 30 near New Castle, Va., when the plane he was piloting crashed and burned on takeoff.

Cunningham was president of Cunningham Brick Co., Thomasville, N. C. The Cunninghams are survived by four sons. Killed with Mr. & Mrs. Cunningham were two other passengers in the single-engine aircraft.

Illinois Brick Earnings Dip

Earnings of Illinois Brick Co., in the 12 weeks ended July 8, totaled $138,646, as compared with $162,281, in the corresponding period of last year.

Sales in the 1961 12 weeks were $1,871,708 against $1,710,774 in the 1960 period.

Fall Meeting Cancelled

It has been necessary to cancel the fall meeting of the Structural Clay Products Division of the American Ceramic Society which was scheduled to be held at the Mellon Institute, Pittsburgh, Pa., Oct. 18-21.

According to the program committee, there was not sufficient material available to round out a good technical program.

Brick Homes Brochure

The Clay Products Association of the Southwest has published a free brochure for the public that informs home buyers on brick homes.

The booklet contains descriptions and sizes of 20 homes designed for brick construction. Complete plans

(*Continued from page 27*)

can be obtained on these designs.

The homes have been designed by competent architects and designers to conform to recognized standards of quality masonry construction and to meet FHA-VA loan application plan requirements.

The free brochure may be ordered from Clay Products Assn., of the Southwest, P. O. Box 4, Austin, Tex.

Change in Ownership

A reorganization of directors and officers of the 96-year old Thos. Moulding Brick Co., Chicago, Ill., took place recently. This was the result of new financial interests in the business, as well as the desire of Joseph Moulding, former president, and Arthur Moulding, former secretary-treasurer, to retire from active management.

William L. Needler was elected as president and chief officer. Other directors and officers elected were James L. Garard, secretary-treasurer and director; Joseph Moulding, vice-president and director; and Arthur Moulding, director.

The Thos. Moulding Brick Co. has been a major factor in the distribution of face brick and in the masonry supply since its founding in 1865. The new management has plans for expanding the operations of the company to include many additional lines of building supplies, such as importations of marble and terrazzo tile and glass mosaic tile from abroad.

Obituaries

Andrew Robinson

Andrew Robinson, formerly associated with the Robinson and Sons Clay Products Co., died recently at the age of 78, in his home in Uhrichsville, Ohio. Mr. Robinson's father Andrew Sr., was the founder of several early clay manufacturing plants.

Fred Leonard Foster

Fred Leonard Foster, one of Hamilton's first industrialists, died recently.

Mr. Foster, with his brother, Stanley, founded the Foster Pottery Co. in 1884. It was the first company in Canada to specialize in the manufacture of clay flower pots. Mr. Foster remained active in the business until his retirement in 1946.

Frank J. Bickerstaff, Sr.

Mr. Frank J. Bickerstaff, Sr., of the Southern Brick & Tile Manufacturer's Assn., died recently at the age of 83 in Columbus, Ga. Services were held at Riverdale Cemetary in Columbus.

Fred C. Nichols

Fred C. Nichols, 78, widely known southern Colorado engineer and businessman died recently in Trinidad, Colo.

Mr. Nichols was an engineer on the Panama Canal for eight years, and five years with Great Western Sugar Co., after which he returned to Trinidad and assumed ownership and managment of the Trinidad Brick and Tile Co.

New Alton Brick Merchandiser Wins Praise

Charles R. Jacoby, sales manager for Alton Brick Co., demonstrates the firm's new brick merchandiser to Earl Clark, shipping clerk.

Charles Jacoby, sales manager for the Alton Brick Co., St. Louis, Mo., reports an enthusiastic response to their "new" revolving display rack nicknamed, the "Brick Carousel." Both dealers and subdivision developers appreciate the compactness of the unit and the ease with which they can show 24 panels of various textures and colors.

The attractive display has a modern compact look and presents a fresh approach to brick selection. The customer takes an active part in the sale by turning the "Carousel" to examine the brick. The panels may be easily removed to place the product in the prospective buyer's hand. The Alton Brick Merchandiser was designed by Morris Hall, production manager

SCPRF News

In answer to the question "What will be the most significant innovations in the design of multistory buildings?" put to him by the editor of *Architectural Forum*, Demetrios A. Polychrone, consulting engineer of Atlanta, Ga., and a member of the teaching staff at the School of Architecture, Georgia Institute of Technology, replied:

> "The most important structural innovation to come will be a return to the use of bearing-wall construction. From a structural engineering viewpoint it is almost ludicrous to see a vast amount of perfectly sound, strong material used merely to provide protection against the weather, as with the curtain wall . . . ."

Although he is just *one* structural engineer talking, Mr. Polychrone is one of the leading *young* structural engineers in the county who are beginning to make names for themselves. His prediction is particularly interesting since, if it actually comes true, it will mean that "sound, strong materials" such as brick and tile will once again perform their true function as load-bearing elements in high rise buildings. It would appear that the introduction of the "SCR multistory design concept" in 1952 was at least 10 years ahead of the d sign profession. Mr. Polychrone's statement may account, in part, for the recently revived interest in the "SCR"* concept by many designers.

* * *

The merits of heated clay extrusion are being investigated by SCPRF's Ceramic Research Division. The extrusion of heated clay is a successful practice in a number of European plants producing hollow tile units with extremely thin shells and webs. Using a small portable high-speed drier designed and built in the SCPRF lab, a small scale trial was run at a member's plant where a portion of the production is extruded with heated clay. The results indicated that units extruded with heated clay can be dried in a fraction of the time normally required, with no adverse effects.

* * *

In his editorial in the last (August) issue of this magazine, your editor pointed out how research builds prestige for the industry and opens doors for its salesmen. Shown here is a good example of how one SCPI region is using research to help build prestige for its regional members and to help open doors for its salesmen. Pictured is the last of a series of six ads being run by SCPI Region 6 (headquarters in Ames, Iowa) in regional trade magazines. Each of the preceding five ads have featured one SCR development being produced or used by members in the region. (See SCPRF News in April issue of BRICK & CLAY RECORD.) Regional Director Jim Neville and his group of progressive manufacturers are to be congratulated. Their efforts are worthy of emulation by others.

* * *

In anticipation of the resumption of the program of testing members' clays for suitability for the production of "SCR verilite"*, a new and improved combination "extrusion-drier" is being built in the Geneva lab to replace the small experimental unit currently being used to prepare clays for bloating in the Selas furnace.

*Reg. U.S. Pat. Off., SCPRF

Things To Come From

STRUCTURAL CLAY RESEARCH

Results! That's what all of us look for from a research organization. And, that's just what the construction field is getting from the clay products industry. For example, take a look at these four developments soon to be in full scale production throughout the country as a result of work done by the Structural Clay Products Research Foundation in Geneva, Illinois.

HIGH BOND MORTAR

A new high-bond mortar which can reduce clay masonry walls to half their current thickness and provide even greater structural strength than present walls is reaching the final stages of development. Consider a four inch brick wall that gives *five times* the resistance to horizontal force just by using a new mortar. Consider the cost savings in multi-story building using four inch clay masonry walls without structural back-up materials. It's coming — and soon!

LIGHT WEIGHT UNITS

The addition of "SCR veri-lite"*, a new light weight clay aggregate, to regular clay produces a significantly lighter unit — up to 40% according to actual firing tests. All of the color, texture, and compressive strength of regular clay masonry is retained. Thus, lower freight rates, lower in-the-wall costs, easier handling and greater dimensional stability appear to be close at hand. Combine, if you will, these features with those of the high bond mortar, and let your imagination soar!

MASONRY PANELS

You like to design with panels but still want to retain the color, texture, and strength of clay masonry? Then the "SCR building panel"** is your solution. Special designs and special effects combined with a thinner wall than must normally be considered can be built right into the structural portion of a building at a most realistic cost. Whether you want to build with pieces or parts, the clay industry has the material.

ACOUSTICAL BUILDING TILE

The most effective way to control sound is to reduce the wall to wall sound bounce. And, that's just what "SCR acoustile"*** does. What's more, you can control the sound while you enjoy the benefits of structural facing tile. An invisible fiberous glass pad directly behind the perforated face does the trick — and does it amazingly well.

NEW DESIGN FRONTIERS USING BRICK AND TILE
ARE YOURS THROUGH *STRUCTURAL CLAY RESEARCH*

SCPI STRUCTURAL CLAY PRODUCTS INSTITUTE

FOR MORE INFORMATION WRITE—

REGION 6 — 120½ WELCH AVE., AMES, IOWA — Cedar 2-6623

BRANCH OFFICE — 401 WESLEY TEMPLE BUILDING, MINNEAPOLIS 4, MINNESOTA — FEderal 9-7055

BRANCH OFFICE — 6929 TEMPLETON DRIVE, OMAHA, NEBRASKA — 391-1681

FIRMS DISPLAYING THIS EMBLEM ARE MEMBERS OF THE STRUCTURAL CLAY PRODUCTS RESEARCH FOUNDATION

*REG. U.S. PAT. OFF., SCPRF **REG. T.M., PAT. PEND., SCPRF ***REG. U.S. PAT. OFF., PAT. PEND., SCPR.

Peskin Transferred

William L. Peskin, former assistant manager refractories, Technical Branch, Carborundum Co., Perth Amboy, N. J., joined Carborundum International, Geneva, Switzerland. Here he will serve as manager—refractories, supervising sales and production activities in continental Europe, British Isles, Africa and the Mid East.

A. P. Green Income Rises

Sales of A. P. Green Fire Brick Co., in the first six months of 1961 were below the 1960 period, but net profits increased, largely because of effective cost-reduction program, greater operating efficiencies and larger dividends from foreign operations.

Net sales for the six months were $19,376,402, as compared with $19,730,466 a year ago. Net income was $921,182, equal to 83 cents a common share, compared with $764,543, or 68 cents a year ago.

Raugh Haws President

James P. Raugh has been elected President of Haws Refractories Co., Johnstown, Pa. effective Sept. 1. He was formerly vice president and general manager of the Refractories Division of H. K. Porter Co., Inc.

E. E. Slick, Jr. becomes Chairman of the Board and Chief Executive Officer.

Gustafson Appointed

James Gustafson was appointed controller of the Denver Fire Clay Co., Denver, Colo., it was recently announced.

Gustafson holds a master's degree in business administration and has been chief accountant, Denver Fire Clay Co., founded in 1876, is a producer of refractories, kilns, industrial furnaces, incinerators and heat treating equipment.

Report Earnings Down

In the six months ended June 30, 1961 earnings for the North American Refractories Co., totaled $165,670, or 49 cents a share, on sales of $5,293,174, compared with sales of $6,876,805 and a profit of $432,443, or $1.64 a share, a year ago.

Appointments at Kaiser

Two major appointments have been announced by Kaiser Refractories, Oakland, Calif.

George C. Davis, Jr., has been appointed to a new position as director of Technical Services. He will be engaged in activities concerned primarily with the long-range planning aspects in the technical field and will

R. E. Pardee

G. C. Davis, Jr.

continue to assume over-all direction of the Technical Service function.

Russell E. Pardee has been appointed manager of Technical Services with headquarters at Oakland, Calif. The Technical Services organization provides engineering and installation assistance to refractory customers.

Joins Research Staff

O. R. Magoteaux, formerly with National Lead Co., has been transferred to the Chas. Taylor Sons Co., Cincinnati, Ohio, a subsidiary of National Lead Co., manufacturers of special refractories.

His new duties will be the research and development of new processes and products.

Announce TRI Meeting

The 1961 Fall Membership and Board of Directors Meeting of The Refractories Institute will be held at the Grand Hotel, Point Clear, Ala. on Thursday and Friday, November 9 and 10. Formal announcement of the meeting will be mailed to the official representative of each member company on Sept. 1.

16th ASQC Conference

Richard S. Bingham, Jr., Manager, Quality Control, the Carborundum Co., Niagara Falls, N. Y., will be among the principal speakers at the 16th midwest conference of the American Society for Quality Control, Oct. 19 and 20, at the Hotel Chase-Park Plaza, St. Louis, Mo.

Speakers on various subjects will develop the theme of the conference, "The Universality of Statistics."

The ASQC is a national organization which encourages the development of statistical techniques to improve quality control in our nation's industrial processes.

New Ohio Basic Plant

The Ohio Fire Brick Co., Oak Hill, Ohio, recently announced plans for the construction of a new plant adjacent to the present Cambria Clay Co. plant, west of Jackson. The new plant will manufacture basic refractories, brick, plastics, and mortars.

Offutt New A. P. Green V.P.

J. James Offutt was elected Executive Vice President of the A. P. Green Fire Brick Co., Mexico, Mo. Offutt, a ceramic engineering graduate from the Missouri School of Mines joined

J. James Offutt

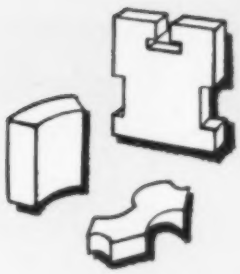
A. P. Green in 1926. His most recent position was that of Vice President and General Manager, responsible for the functions of sales, research and operations.

He succeeds J. L. Miller, who retired on July 1.

Circle Service No. 35 ⟶

PUT *Air Power* TO WORK

FOR PROFIT ON SPECIAL SHAPES



HANDLES ALL REFRACTORY MATERIALS.

WHY TIE UP production presses for short runs on special shapes?

Here's how it works:

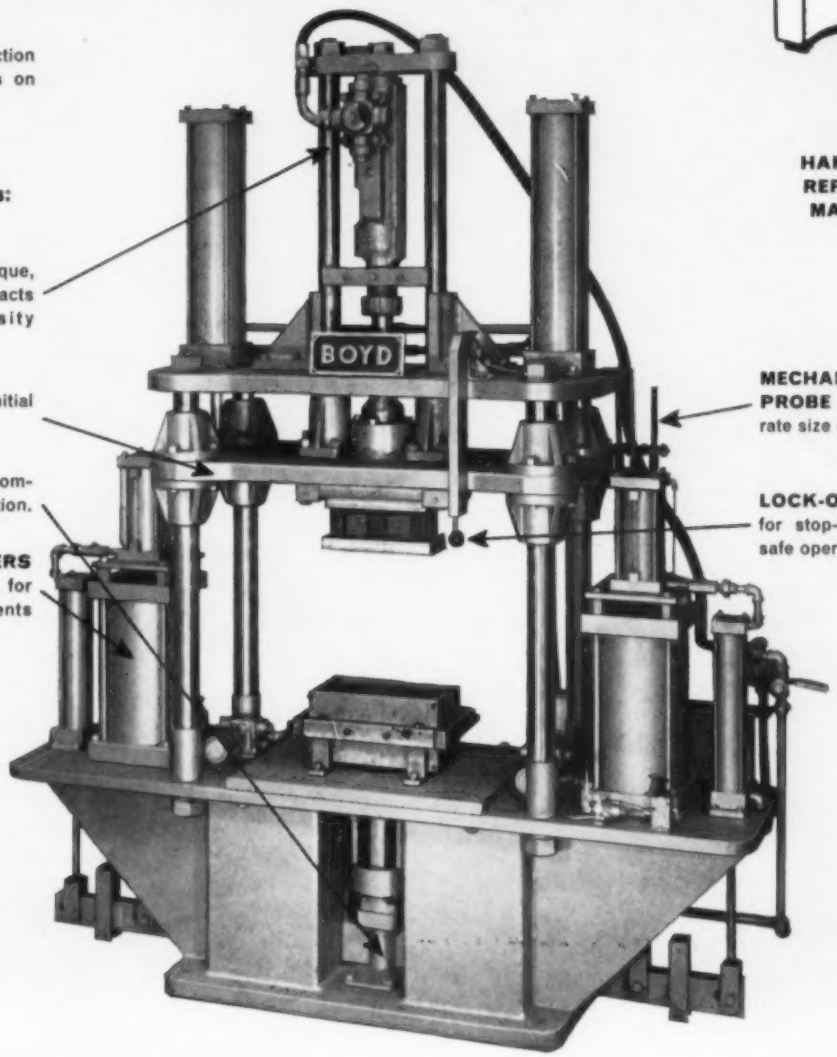
TOP TAMPER of unique, heavy duty design compacts mix to desired density after . . .

CROSSHEAD exerts initial pressure—and holds it.

BOTTOM TAMPER completes top-'n-bottom action.

RETARDER CYLINDERS give oil-cushion action for smooth ejection, prevents "popping."

BOYD BUILT— for dependability.



MECHANICAL PROBE assures accurate size control.

LOCK-OUT LATCH for stop-start assures safe operation.

SHAPE-O-MATIC . . . a new Compacting Press by BOYD

Here's the press that is destined to do away with unnecessary and costly hand molding of special refractory shapes.

The new Boyd *Shape-O-Matic* compacting press puts air to work to reduce the labor, guesswork and *scrap* common to hand pressed shapes. You use a minimum of moisture and set direct to the kiln car. Most important, Shape-O-Matic is designed to handle *any* refractory material. In-plant experience has shown that densities are possible which approach that achieved on a power press.

If you're hand molding . . . or tying up high production power presses for short runs on special shapes, it will pay you to investigate how the new Boyd Shape-O-Matic can quickly pay its way in your plant. *Write for specifications.*

BOYD POWER PRESS

CHISHOLM, BOYD & WHITE COMPANY 1060

A Subsidiary of Wehr Steel Company

610 W. 57th STREET • CHICAGO 21, ILLINOIS

Put the EARNING POWER of a **UNIT** in your pit

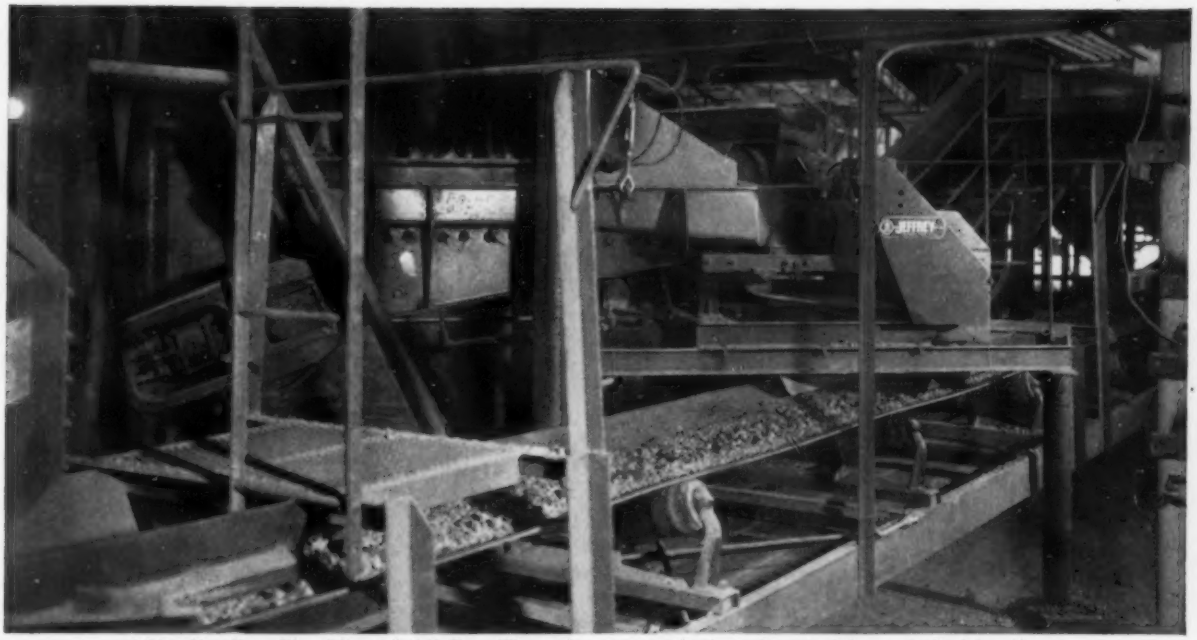
This one does a man-sized job — has real muscle and speed to give you the power, capacity and output you require to make a profit from your pit operation. UNIT shovels and draglines are dependable producers, whether digging, loading, stockpiling, or dredging. Low original, operating and maintenance costs, *plus* reliable production, mean you *earn more* with a UNIT from each ton of material moved. ■ Here are some important reasons why UNIT is your most profitable choice for an efficient, cost saving excavator. ■ The exclusive, one-piece cast gear case (there's nothing else like it) keeps machinery in perfect alignment and seals out all dirt and moisture for virtually maintenance-free operation. ■ Straight-in-line mounting of the engine and main machinery contributes to the low operating cost by eliminating many wearing parts, reducing friction loss, and harnessing every bit of horsepower. A worm drive transmits the power smoothly — features an efficient, one-step reduction from engine speed to the main machinery. ■ Disc clutches wear evenly for longer life and their smoother operation reduces load shock on the entire power train. ■ Automatic traction brakes provide an instantaneous traction lock on steep grades . . . are quickly serviced because split brake drums allow linings to slide in or out without completely dismantling brake shoes or drums. ■ Your factory-trained UNIT dealer has full information on the complete line of UNIT ½-yd., ⅝-yd. and ¾-yd. excavators. Call him *now* for detailed specifications and price information.

UNIT **CRANE & SHOVEL CORP.**

6649 W. Burnham St. • MILWAUKEE 19, WISCONSIN

SHOVELS ½ to ¾ YDS. DRAGLINES ½ to ¾ YDS.

Circle Service No. 27



3 blending lines like this, with 7 Jeffrey Waytrols in each line, are in service at Henderson Clay Products, Inc., Henderson, Texas. With volume proportioning of materials controlled by these Jeffrey Waytrols, mix is always uniform and color variations are eliminated completely.

"Color Comparisons Haunted Us"

Henderson Clay Products used to need a constant vigil over mixtures to maintain brick color. Finished bricks that lacked the required color uniformity had to be sorted by hand—a slow, costly job.

That was before a tremendous expansion program to boost output from 4½ to 7½ million bricks per month was undertaken at their plant in Henderson, Texas. As part of this expansion program, twenty-one Jeffrey WAYTROLS® were installed. Operating in batteries of seven on each of three make-up lines, these Jeffrey Waytrols completely eliminate color problems caused by improper volume proportioning of materials. Now when quick, easy Waytrol settings are made, the mix stays fixed throughout an entire production run. Waytrols allow four or five different clays, as well as calcined clay or grog, to be perfectly proportioned so that color is always on the button.

Other improvements made by Henderson include a new Jeffrey B-3 36″ x 60″ pulverizer with a Jeffrey feed to process calcined clay and broken bricks (grog).

Waytrols will save labor wherever you're now doing manual measuring or weighing, and provide continuous feeding instead of batch methods. For further information about Jeffrey weigh-feeding, ask for Catalog 941. The Jeffrey Manufacturing Company, 916 N. Fourth St., Columbus 16, Ohio.

If it's conveyed, processed or mined, it's a job for Jeffrey.

JEFFREY

Circle Service No. 19

for the ***Denver Brick and Pipe Company's***

NEW AUTOMATED SEWER PIPE PLANT

- Preliminary Studies
- Plant Engineering
- Purchasing
- Management of Construction to Owner's Key

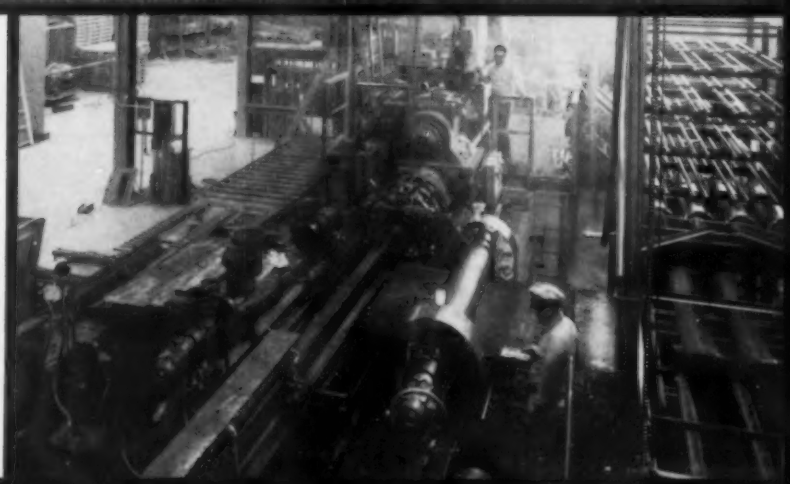
FOR

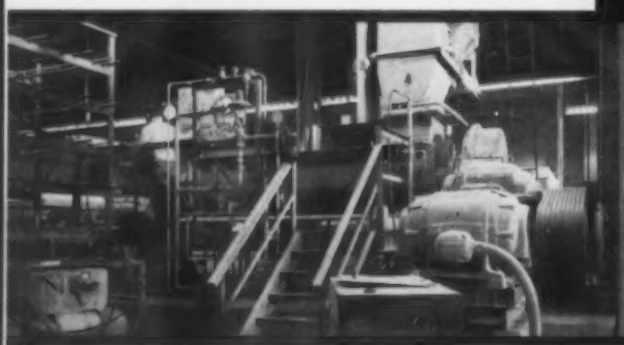
SWINDELL-DRESSLER

Now completed for Denver Brick and Pipe is a Swindell-Dressler engineering study and construction program resulting in one of the West's most modern and efficient sewer pipe manufacturing operations.

The problem was to reconstruct two adjacent old plants into one modern unit, retaining the best of existing facilities; adding a complete clay handling and storage system, horizontal extrusion equipment for sizes up to 12", a vertical hydraulic press for large diameter pipe up to 36" x 6' long, a four-track Dressler-Robinson horizontal dryer, the latest equipment for automatic pipe handling including automatic rack loading and unloading—all without major interruption to continued flow of production.

With these objectives accomplished, the Denver Brick and Pipe Company is now efficiently producing all pipe sizes from 4" through 36" at notably lower cost levels. • Let us consult on your future plant engineering and construction requirements.





SWINDELL-DRESSLER CORPORATION

ENGINEERS AND MANUFACTURERS

PITTSBURGH 30, PA.

The SWINDELL-DRESSLER CORPORATION of Canada, Ltd.,
Toronto, Canada

Circle Service No. 33

AUTO CLAY MATION 1961

Automation and Depreciation—

Two "Musts" For Our Industry

Today's heavy clay products manufacturer needs a lot more than a good product if he hopes to sell all his production and still maintain a healthy margin of profit. He also needs to stay on top of new trends that seem to be emerging almost every day in manufacturing and marketing of his products. These trends all point to one basic principle in the manufacture of clay products—more, and soon complete, automation. In the following pages the editors of BRICK & CLAY RECORD bring you up to date on the latest devices which can be utilized for achieving more automation in a clay products plant, and they look forward to the erection of a completely automatic plant. It is inevitable that this will soon come about.

You may ask "Can We Afford Automation?" The answer is you can't afford not to automate. Automation ties in directly with what was once considered strictly a production or financial headache; the revision of this country's sadly outdated and unrealistic laws governing depreciation of plants and capital equipment.

Under the present tax structure, it takes industry so long to recover the money it spends on equipment that many industries now have to make do with machines, techniques and processes that are 15 to 20 years old.

Worse yet, creeping inflation has meant that companies today are writing off machines at the prices of the '40's—often only a third or a quarter as much as it will take to replace them with today's more automated equipment.

Yet to replace equipment before it is fully depreciated is so terribly expensive that it seriously drains the resources available to other necessary corporate functions—one of which is automation. The result is that today an estimated third or better of our productive machinery is very badly outmoded compared with that of other industrial countries—all of which, incidentally, have more liberal tax plans.

All this means that the American clay products manufacturer is forced to waste money he could otherwise put to better use.

For example, on the most basic level is the effect a more liberal arrangement would have on the economy as a whole. Many experts, including the Treasury Department, believe that a half million new jobs would be created in the first year after the new laws went into effect. In that same period, $1.7 billion would be pumped back into the economy.

There are many more reasons why every clay products manufacturer should take a close look at, and become interested in, the depreciation hassle.

It is basic that as production costs go down, the amount of company money available to other purposes increases. The percentage of profits would be bound to take a healthy jump.

New, more efficient equipment—including the latest wonders of automation—would make possible major reductions which would not only spur buying of one's own product but would give the clay products industry a more even chance against outside competition from other building materials.

Newer, more versatile equipment would permit a greater flow of new market-stimulating products, both by providing a wider range of production possibilities and by making extremely expensive conversion of old equipment unnecessary.

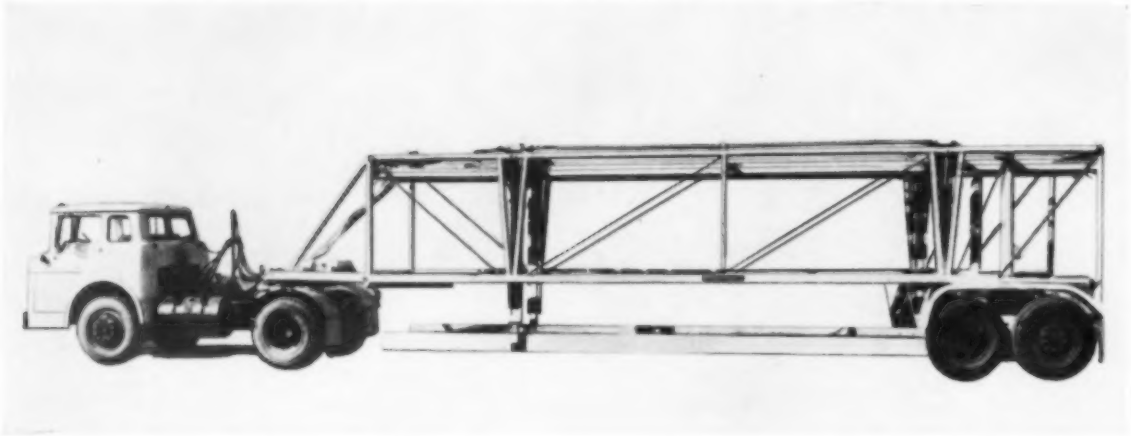
Tax reform would also allow the producer to upgrade his own capital equipment, thereby bringing more automation at a faster rate.

Fortunately, this tax reform is no longer just a dream. Administration and Congressional leaders are in favor of it. Right now there is legislation in the works which may well result in a temporary tax credit to be granted across the board on capital expenditures. Because of its inflexible nature, however, this will tend to have an unfair cumulative effect. Therefore, it is more important than ever that genuine basic revisions be made in the depreciation allowance structure.

Both this year's bill and the sweeping reforms of the future are critically needed steps—for complete automation.

AUTO CLAY MATION 1961

New "Strad-O-Lift" Trailers For Large Unitized Loads



The Towmotor Corp. has added a series of "Strad-O-Lift" trailers to its extensive line of material handling equipment. These trailers are designed to pick up large unitized loads of all types of materials and transport them at highway speeds.

Available in standard lengths up to 40-feet. "Strad-O-Lift" trailers simply back up, straddle the load, lift and transport it to its destination. They hitch to standard truck tractors and are equipped with adjustable hydraulic lifting shoes which operate by power take-off from the tractor. Touching a lever in the cab, the driver opens, closes, raises and lowers the shoes, which carry loads up to 20 tons safely at highway speeds.

The trailers will pick up and haul pallet loads of brick, block, slabs, beams, and other products. They have a low center of gravity making them exceptionally stable on curves and rough roads. Reports from users indicate the "Strad-O-Lift" takes less than a minute to load a cargo capacity and unloads it just as quickly at the destination. *Towmotor Corp.*

Circle Service No. 80

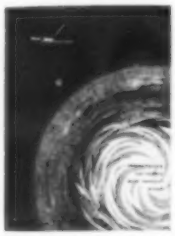
Horizontal Vibratory Screens—A new 8-page bulletin that describes a line of horizontal vibratory screens and conveyors has just been released by COMCO Corp.

Bulletin B-100 illustrates the COMCO screen's exclusive true balanced-mass design and point-

of-no-oscillation suspension with photos and drawings. A special section describes the screen's positive, self-adjusting eccentric drive. Another section discusses how COMCO screens can improve operations. *Comco Corp.*

Circle Service No. 81

Refractories For Rotary & Vertical Kilns—A 24-page color-illustrated booklet "Refractories For Rotary & Vertical Kilns" is available for interested readers from Kaiser refractories. The booklet describes the various types of Kaiser refractories available for



these installations and describes the various services to which they are subjected. Installation procedures in rotary kilns are also discussed as are applications for rotary and vertical lime kilns. *Kaiser Refractories & Chemicals Division.*

Circle Service No. 82

Dust Control Bulletin—A number of effective methods for controlling industrial dust and fumes are described in a new 20-page bulletin by Pangborn Corp.

Bulletin 922A is prefaced with a short non-technical explanation of the advantages

available through proper dust control, and lists the basic essentials comprising a typical dust control system.

Each Pangborn collector is described and illustrated with photographs and line drawings. *Pangborn Corp.*

Circle Service No. 83

Pressure-Sensitive Tapes—"How to Select a Pressure-Sensitive Tape" is the title of a booklet published by Johns-Manville Dutch Brand Division. The 2-color, 4-page booklet, DB-56A, contains interesting and valuable information on the types of tapes available, how

they are constructed and the factors involved in choosing a particular tape for a specific applicaton.

The contents of DB-56A include an introduction that discusses factors influencing choice of tapes. *Johns-Manville, Dutch Brand Division.*

Circle Service No. 84

New Portable Equipment for Rapid Conveying

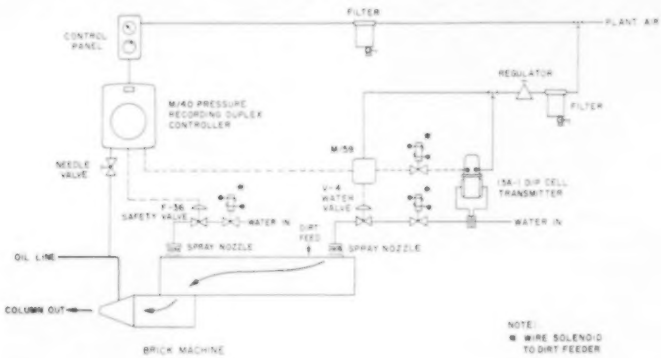
The Hoffco-Veyor, a new and versatile cost cutting portable pneumatic system designed to keep materials moving rapidly, has been placed on the market by Hoffman Industries, Inc. Available in two standard models, No. 100 and No. 150, Hoffco-Veyors offer a proven new concept in material handling flexibility and are said to have provided an 80% saving in labor costs and increased plant efficiency by 20%.

Equipped with inlet valves to take standard size 1½ to 2 inch vacuum hose, Hoffco-Veyors can be used as vacuum cleaners when not in use as portable conveyors. Hoffco-Veyors provide rapid, safe movement and recovery of such materials as rock granules, plastic pellets and gritty or pulverized substances. They also convey a wide variety of dry materials and corrosive chemicals.

Hoffco-Veyors easily turn their own length, can be wheeled to any location in the plant and immediately put to work on otherwise hard to get at materials. They convey from 50 to 100 lbs. per minute continuously or intermittenly depending on requirements. Where quantities exceed 7½ cubic feet, standard 55 gallon drums can be used as auxiliary collectors. Hoffman designed adaptor covers include inlet and outlet connections. Adaptor covers are held in place by vacuum—can be shifted easily from one standard 55 gallon drum to others as needed. *Hoffman Industries, Inc.*

Circle Service No. 85

Brick Column Consistency Controlled By New System



A new, fully automated system for controlling the consistency of extruded columns is being manufactured for brick pug mill operators by the Foxboro Company, Foxboro, Mass., makers of industrial instruments.

First of its kind in the industry, the "packaged" system requires only a minimum of monitoring and can be run by the cutter man alone. It eliminates sagging or crushed brick, excessively long drying schedules, blown or clogged dies, and other problems associated with too little or too much water. Once the controller set point is established, column consistency is automatically maintained for a uniform product throughout the run, and from one mix to the next.

Depending on the type of die used, column consistency is measured either in terms of back pressure in the machine lube line or as motor load—each of which is directly related to consistency of extrusion. A duplex consistency controller records this measurement and ascends a pneumatic signal to a flow controller in the water line to assure correct addition of water. A second outpit from the consistency controller will operate a safety valve in the pug tub water spray line to counteract any abnormal consistency resulting from an abrupt change in clay quality.

Two solenoid actuated valves, wired in parallel with the clay feeder, stop water flow when the feeder stops; another locks the control system so that normal water flow will resume without delay at the startup.

The pressure system, as shown, is recommended where water or oil lubrication is used and where there is a sufficient difference in backpressure between a wet and a dry column. *The Foxboro Co.*

Circle Service No. 86

Heat Exchanger—The Roto-Fin heat exchanger, designed for high-volume cooling or heating of bulk materials, is described in a six page Folder 2911, just released by Link-Belt Co.

Diagrams and photographs illustrates the simple, compact design of the Roto-Fin, which is a rotating drum with a series of flat, dual-purpose hollow fins or "cells" lapped consecutively

around the inside of the drum to form an Archimedes spiral.

Typical applications outlined or illustrated in Folder 2911 include: flue dust, finished cement, gypsum plaster, foundry sand, sugar, copper concentrates, sewage sludge, fluid coke and salt. Also shown is a laboratory-size Roto-Fin which is available for in-plant testing of any materials. *Link-Belt Co.*

Circle Service No. 87

Crushing Wet Materials—Bulletin 6020, published by the Pennsylvania Crusher Division, describes a new crusher designed for fine reduction of wet and sticky clays or shale without the inherent problems of plugging and caking. On six pages, this bulletin gives complete data including weights, dimensions and materials of con-

struction for the Pennsylvania Twin-Rotor Impactor. As described in Bulletin 6020, this crusher is offered in two sizes, taking feeds to six and eight inches. The Twin-Rotor Impactor is rated for capacities to 100 TPH in closed circuit crushing to produce 100 percent minus 8 mesh product. *Pennsylvania Crusher Division.*

Circle Service No. 88

AUTO CLAY MATION 1961

New H-30 "Payloader" Now Available

One of two Hough "Payloader" tractor-shovels owned by the Lawrence Refractories Clay Co., Pedro, Ohio, is shown loading out a heaping bucket of silica gravel used in the mixing of cublo patch. This Model H-30 "Payloader", with an operating capacity of 3,000 lbs., is manufactured by The Frank G. Hough Co. In addition to handling silica sand, the two tractor-shovels move various raw products around the plant from stockpiles to the mixing site.

The Lawrence Refractories Clay Co. mines and processes fire clay and refractory lining materials for use in the iron and steel industries. *Frank G. Hough Co.*

Circle Service No. 89

Dry Fluid Drives Deliver Soft Starts for Industry

Operations of mixers and conveyors are smoothed out simply and inexpensively with Flexidyne dry fluid drives and couplings, which enable normal torque motors to pick up heavy inertia loads without excessive strain or prolonged high current draw. Unit also protects motors against jams and unexpected overloads. It uses heat-treated steel shot as a flow charge. Initial slippage is momentary. Housing and rotor become locked together by the flow charge and full load is carried without slip at normal operating speeds. Eight drives and 10 couplings, fractional to 1,000 hp. are available from stock. *Dodge Manufacturing Corp.*

Circle Service No. 90

Scientific and Test Instruments—Second revision. Forty-eight pages and 100 illustrations describing Honeywell instruments and systems widely used in the field of scientific measurement, recording, and testing. A typical product page includes a sharp half-tone illustration, a

clear, concise description, many primary specifications, and a handy reference to more product information. This revision includes a price range of approximate price for each instrument or system described. Catalog G-10b. *Minneapolis-Honeywell Regulator Co.*

Circle Service No. 91

New Magnetic Separators—Illustrated bulletin 993 describes the new magnetic separators with ceramic permanent magnets. These new wet drum separators supplement the Jeffrey electro and alnico permanent magnetic machines.

Extensive research and development showed wide application of the ceramic magnet-type

separators. Satisfactory results have been obtained from these machines in actual operation on the job.

A higher intensity, deeper and more uniform magnetic field is developed at less cost than possible with other types of permanent magnets. *The Jeffrey Manufacturing Co.*

Circle Service No. 92

Buildings and Accessories—A 3-color catalog gives complete information about Varco Uniframe buildings and accessories. These buildings have been used most successfully in the brick and clay industry. *R. G. Varner Steel Products, Inc.*

Circle Service No. 93

Steel Belt Conveyors—Sandvik Steel, Inc. offers a new 16-page picture book on steel belt conveyors, entitled "Pictures of Conveyors in Action."

The new brochure contains sections on bulk conveying, piece goods conveying, work tables, and water bed conveyors for cooling materials in transit.

The section on bulk material

handling has 12 photos showing Sandvik conveyors handling such materials as sugar, iron ore, and clay.

The piece goods section has six pictures showing steel belt conveyors handling such items as cheese, brick, bagged material, cartons, and people. *Sandvik Steel, Inc.*

Circle Service No. 94

Fireclay Brick—The Refractories Division of Gladding, McBean & Co. has published a new 4-page brochure on firebrick. The attractive color brochure contains photographs and

descriptions of the complete line of the company's fireclay brick. The publication also features a chart of typical physical properties of each of the brick and estimating data. *Gladding, McBean & Co.*

Circle Service No. 95

Industrial Trucks Selector Guide—The Automatic Transportation Co. has published a new Industrial Trucks Selector Guide which will be of assistance to all material handling men in setting up new or revising present systems in relation to their specific plant problems. Over 150 models to fit all requirements are illustrated in this 20 page, two-color booklet. *Automatic Transportation Co.*

Circle Service No. 96

New Boom Type Lift Solves Loading Problems

A new boom-type Jiffy-Lift has been announced by the Elberfeld Manufacturing Co., which might be the answer to your loading and unloading problems. The new lift, with a 17-ft. boom, can put materials into deep basements or on second-floor levels with equal ease. The boom rotates continuously 360 degrees so that the truck or trailer has to be positioned only once before unloading from either side or the back of the truck.

The Jiffy-Lift is mounted above the present truck-bed away from harmful road debris. Or it can be mounted on one of the custom made boom-beds furnished by the company. The boom elevates to 90 degrees to facilitate loading or unloading on second floor levels or over high walls or fences. It drops loads into basements 21 feet deep. The fork is self balancing with adjustments for cube height and tine spread. Hydraulic stabilizers keep the bed level enabling the entire load to be unloaded from one piston. *Elberfeld Manufacturing Co., Inc.*

Circle Service No. 97

Buildings Used Widely In Brick Industry

R. G. Varner Steel Products, Inc. specializes in buildings for the brick and clay industry. Operating under the trade name Varco, the company has erected structures throughout the nation.

Product features Uniframe construction—a modern welding process that creates a solid, one-piece steel framework. Nuts and bolts are eliminated from the framework structure. Varco structures shown in the photograph are at the Universal Sewer Pipe Corp. plant in Ocala, Fla. Buildings comprise approximately a quarter-million square feet of floor space. When one-half finished, buildings at the Ocala plant were subjected to the fringe elements of Hurricane Donna. No damage whatsoever was recorded. Seventy thousand square foot section of buildings was under roof within six weeks of contract signing. Structures support three overhead cranes with one, five and 8 ton capacities. Cranes were attached directly to the Uniframe bents. *R. G. Varner Steel Products, Inc.*

Circle Service No. 98

AUTO CLAY MATION 1961

Unloader Scores in Brick Industry

The unloader pictured is all hydraulic remote controlled and is said to be versatile, fast and simple to operate. The boom raises to a 60° angle, and the unit will set loads on a 20-foot high platform. The unloader can be operated without raising the boom.

The unit has capacities from 3000 pounds to 6000 pounds. The manufacturer recommends that the 3000-pound capacity unit is proper for the delivery of packaged brick. *Waterloo Unloader Corp.*

Circle Service No. 99

Potentiometers Feature Compactness, Low Cost

Three new, low-cost, portable potentiometers have been announced by Leeds & Northrup Co. These instruments provide on-the-spot measurements of temperature for instrument maintenance departments, and in testing and research work.

The 8694 single-range and the 8695 double-range temperature potentiometers indicate temperatures directly in degrees F in any of 15 temperature ranges. The 8696 double-range millivolt potentiometer is calibrated for emf measurements on two ranges, 0 to 22 and 20 to 64 . . . has a manual reference junction compensation dial and can be used as a source of calibrated voltage for checking other potentiometer-type instruments.

All three instruments have a basic accuracy of ± 0.3% of range and have a pointer galvanometer with a sensitivity of 0.6 μa per scale division. Designed to withstand rugged operation, they are compact in size —only 7″ x 6″ x 5″—and weight only 4½ pounds. Each is housed in a sturdy metal case with a durable gray vinyl finish. *Leeds & Northrup Co.*

Circle Service No. 100

Vibratory Materials Handling Equipment—A new condensed catalog of vibratory materials handling equipment, vibrating parts handling equipment, mechanical shaft seals, paper joggers, portable power tools and power rectification equipment has been published by Syntron Co.

The new catalog, No. 616, contains over 200 illustrations and presents descriptions, data and specifications. *Syntron Co.*

Circle Service No. 101

Grinding Mill Control—The new Electric Ear grinding mill control with continuous recorder is described in Bulletin AH-480-31 by Hardinge Co., Inc. The grinding mill control keeps the mill operator alert and tells him when he makes incorrect adjustments. It records operating and down-time and tells when the storage bin runs empty or bridges. The control indicates when mill conditions are abnormal. *Hardinge Co.*

Circle Service No. 102

Sand-Molded Brick—Posey Iron Works, Inc. describes the automatic manufacture of sand-molded brick in Bulletin 10, available to interested parties. Using the "Lancaster" Autobrik machine and "Lancaster" automatic pallet car loader, the process is adaptable for producing sand molded colonials from any clay or shale that can be successfully made into brick by hand. *Posey Iron Works, Inc.*

Circle Service No. 103

Move Kiln Cars Efficiently—All the information needed on how to move kiln cars efficiently in a plant is available in literature from Gravely Tractors. The literature describes the Gravely tractors and all the attachments which are available for making the tractor a good utility machine around a heavy clay products plant. The catalog, "How To Cut Costs," is available as well as a free demonstration. *Gravely Tractors.*

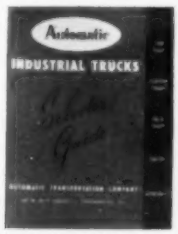
Circle Service No. 104

Automated Weighing Processes—Weighing is as vital to industry as the raw materials that go into the product. A 4-page bulletin Y-70, describes the most recent developments

in Detecto scales and automatic weighing processes. It covers and gives a representative selection of scales, both heavy-duty and light industrial. *Detecto Scales, Inc.*

Circle Service No. 105

Gas-Powered Lift Trucks—The flexibility of gas power plus the efficiency of electric drive offered in the GLF series lift trucks is discussed in a new 16-page "How" booklet



published by the Automatic Transportation Co. Now the benefits of electric drive proven in railroad locomotives and construction equipment are available to you in a lift truck. *Automatic Transportation Co.*

Circle Service No. 106

Overhead Electric Cranes—A newly published sales bulletin which covers the new "Shaw-Box" line of Series "D" overhead electric traveling cranes is available from Man-

ning, Maxwell & Moore, Inc.

The series "DE Cranes are used in regular duty service in all types of industry, at plants both large and small. *Manning, Maxwell & Moore, Inc.*

Circle Service No. 107

Mortars, Mastics, Grouts—Just published is an illustrated and informative eight-page catalog on mortars, mastics, grouts and other related products for ceramic tile installation. Also

described is the complete line of specialty items for the mosaic tile trade and the marble and terrazzo fields. The new brochure is offered by Technical Adhesives, Inc. *Technical Adhesives, Inc.*

Circle Service No. 108

New Unit Convertible Shovel

Newest addition to the Unit line of power cranes and excavators is the Model 271-C, a 1-yd. shovel which is easily converted to dragline, trenchoe, clamshell, liftcrane, and magnet crane front ends. Among the machine's many new features is a compact swing circle gear assembly with upper works mounted on a large diameter, double live ring of steel balls running in hardened races. A friction-free, fast swing is the result, and with the center pin mounting, hook and turntable rollers, and roller path eliminated, there's practically no day-to-day lubrication or maintenance required.

The swing clutches on the new Model 271-C last longer because of a unique cooling system which dissipates the heat. Swingers run in a bath of oil which is kept cool by a series of copper coils connected directly to the radiator cooling system. Temperature is held below the point where clutch-lining is affected. *Unit Crane and Shovel Corp.*

Circle Service No. 109

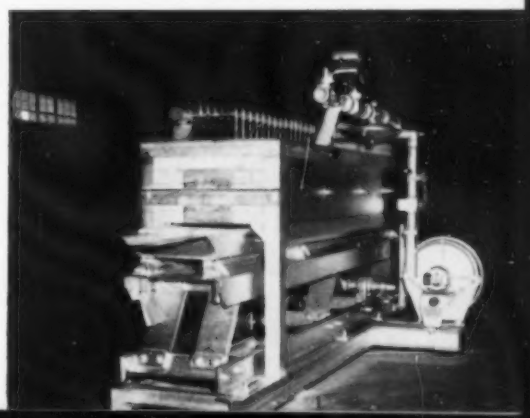
Portable Calcining Machine For Testing Programs

Newest addition to Miller Equipment Co.'s line of calcining machines is the small portable vibrating hearth furnace shown in the photograph.

The unit shown in 10-feet long, and has a vibrating tray width of only 6-inches. It is capable of producing up to 400 pounds per hour of material which has been calcined at temperatures of from 1650° to 2000° F.

The small machine is ideally suited for companies which want to start a testing program to determine exactly what advantages a calcining program will bring about, without investing in a production-sized unit. It is fired by radiant-heat burners from the top of the arch of the furnace. *Miller Equipment Co.*

Circle Service No. 110



Mathematical Functions—It's almost unbelievable, but all the tables listed in the above title are in this handy (2⅝ x 5⅝) compact (192 pages) Vest-Pocket Library Book.

Beside the tables, there are eight pages of formulas, eight pages of interpolation, and other pages of valuable information.

The price of this book is $1. All the tables are carried out to at least six places. It's indexed, too. *Ottenheimer Publishers, Inc.*

Circle Service No. 111

Solve Feeding Problems—B-I-F Industries has just issued "It's A Fact" data on the problem of handling modifiers, coloring agents, body conditions, finders, glazing agents, re-foaming agents, fluxes and opacifiers in the Clay and Ceramic Industries. This new data, accompanied by pertinent bulletins, describes the accurate and economical solution for feeding

dry powders, clay slurries, suspensions and liquids.

The 2-page data sheet and accompanying bulletins contain illustrations, schematics of typical installations, dimensions and a thorough description of the operation, uses and advantages of B-I-F equipment for the feeding of dry or liquid materials. *B-I-F Industries.*

Circle Service No. 112

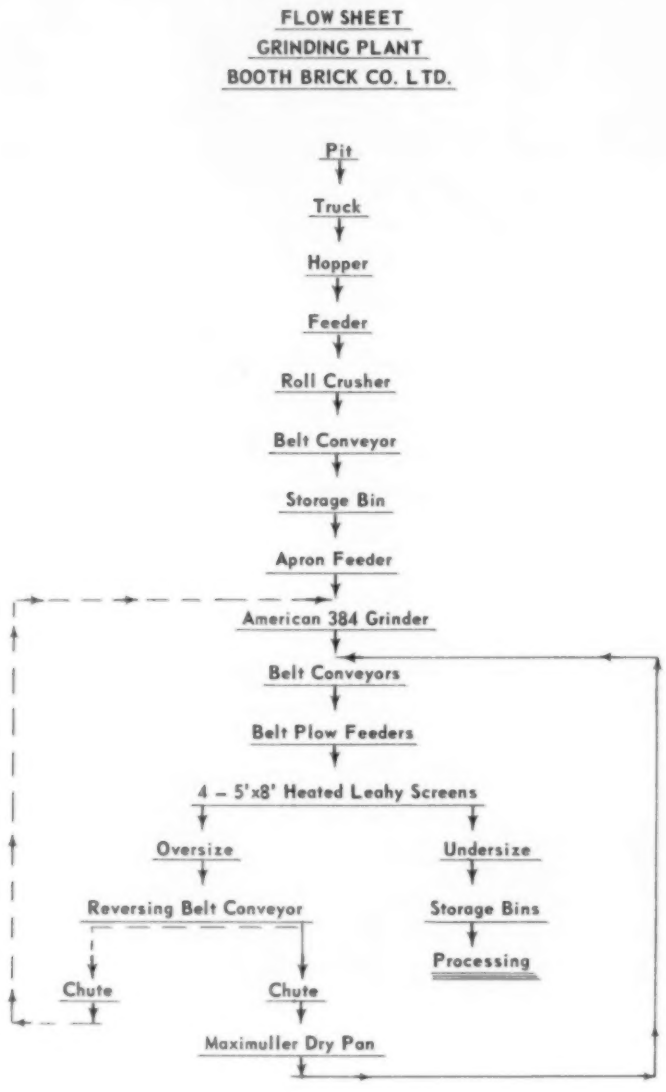
Vibration Inducers—Martin Engineering Co. announces a new 42-page catalog which provides engineering data, specifications and a price list on the "Vibrolator" line of vibration inducers. It lists 52 sizes and types from the BD-10 (4½ ozs.) to the 6600 lb. impact CCVP series hopper car shaker (72 lbs.). Units are available in five motive powers—pneumatic, electric, gasoline, hydraulic and steam.

Installation data sheet at rear of catalog may be filled out and sent to fatcory for help in solving problems of applied vibration. *Martin Engineering Co.*

Circle Service No. 113

AUTO CLAY MATION 1961

Automation Featured in Flowsheet of Booth Brick Co.



The accompanying flowsheet is that of the grinding plant of the Booth Brick Co., Toronto, Ontario, whose new grinding plant went into operation recently. The automation features of the grinding plant were worked out by the Deister Concentrator Co. and the Forrest Paschal Machinery Co. and deal with the controls that were installed on the new American 384 rim discharge grinder and a Maximuller dry pan.

When the plant is started, the apron feeder feeds its material into the rim discharge grinder until the load on the grinder motor reaches a predetermined point and remains at or exceeds this predetermined ampere load for a preset number of seconds, after which the control automatically stops the apron feeder. When the grinder works out from under its load and the ampere reading on the motor drops to a predetermined minimum level, the control will again start the apron feeder bringing material to the grinder.

The discharge of the grinder goes

by a series of belts to a battery of four 5-ft. by 8-ft. totally enclosed Leahy screens, with FlexElex heaters, with feeding of the screens by belt-plows, two per screen, plowing material off the flat feed belt. The screens are located on top of the large finished clay storage bins and the undersize of the screens passes directly down into these enclosed bins. The screens are placed in line and the oversize from the screens falls down onto a reversing belt which normally send the screen tailing to a chute discharging into the Maximuller dry pan located on the same lower level as the grinder. The dry pan discharges onto the same belt that handles the grinder discharge. Alternately the reversing belt can send screen tailings to the grinder.

A second set of electrical controls is installed on the Maximuller, so that when the load on its motor reaches a predetermined maximum point, the controls will reverse the direction of travel of the screen tailings belt and send these tailings to a chute discharging into the rim discharge grinder. When the load on the Maximuller motor drops to the predetermined minimum level, the screen tailings belt is again reversed to send tailings back to the Maximuller.

Under this set-up complete automation is obtained and the two grinding means: the rim discharge grinder and the dry pan, operate at all times under optimum load for most efficient grinding while at the same time, the Leahy screens are receiving a uniform load.

So effective is this means of automatically controlling the grinding circuit that the entire grinding circuit, including that of the primary crushing of the raw material located in a crusher house at a distance of 50 yards from the main grinding room, is handled by a single operator.

This modern and efficient grinding circuit is producing material for two separate plants. *Deister Concentrator Co.*

Circle Service No. 114

How To Move Kiln Cars and Save Money

The Tri-State Brick & Tile Co., Jackson, Miss., and the Boren Clay Products Co., Pleasant Garden, N. C. have proved a new use for the versatile 6.6 hp Gravely Tractor that will save plant operators time and money.

The Gravely substitutes power for the tedious, time-consuming hand methods of moving kiln cars in and out of kilns and spotting them where they are needed in the plant. The tractor has two forward and two reverse speeds, and is small enough to provide maneuverability so that it can operate effectively in close places. And it is powerful enough to move loaded kiln cars weighing up to 100,000 pounds.

The completely enclosed machinery keeps out dust and dirt and holds down repair bills. There are no chains or belts to slip, break or wear out. A variety of attachments is also provided so that it is possible to prepare scove kilns faster and more efficiently. *Gravely Tractors.*

Circle Service No. 115

Versatile Crusher-Shredder Bauer's No. 7-AB crusher-shredder, a heavy duty unit with a wide range of crushing, precrushing or shredding applications in operations where a minimum of fines is desired, is described in Bulletin G-6, now available from the Bauer Bros. Co.

A photo-diagram points out design and construction features of the unit which can be used for crushing lumpy chemicals, copra, clay, coke, shells, cobs and similar materials.

The crusher-shredder is available in two sizes—with an 18" or 35" wide inlet opening. *The Bauer Bros. Co.*

Circle Service No. 116

Variable Speed Sheaves—Wood's Bulletin 25103 brings into one booklet two types of motion-control variable-speed sheaves, hitherto covered in separate catalogs. The "MS" and "MCS" variable-speed sheaves embody a design concept that completely eliminates freezing and sticking from fretting corrosion, allows sheaves to run indefinitely at one speed and then afford easy adjustment

without sticking. The new bulletin pictures and describes "MS" sheaves rated at from 2 to 15 hp and "MCS" sheaves rated at from 7.5 to 20 hp. "Sure-Grip" companion pulleys and sheaves, variable-speed belts, motion control motor bases and "Quick-Slide" motor bases are also covered. 16 pages, letterhead-size, two colors. *T. B. Wood's Sons Co.*

Circle Service No. 117

Unloaders—This recently published brochure gives a complete description of this company's line of unloaders, illustrating the features, models and variations. Also included is a partial list of users in 31 states, Canada, and Puerto Rico. *Waterloo Unloader Corp.*

Circle Service No. 118

Ceramic Extrusion Presses—A 4-page brochure describing hydraulic presses for the ceramic and related industries for use in forming ware from stiff mud and dry granular material is available from Benjamin Lassman & Son. Illustrated and described are hydraulic presses for forming ware from granular mixes in completely automatic and continuous cycles. The presses shown each have been built to produce a specific product or a range of products, from floor tile to burner tile and refractory shapes. *Benjamin Lassman & Son.*

Circle Service No. 119

Electronic Controls—Johnson electronic controls for automating concrete pipe and block plants are described in a 6-page brochure available from C. S. Johnson Co. a division of Koehring Company.

Brochure illustrates Johnson dial transmitter for dial scales, master control panel for en-

tire plant, individual mixer and batch control cabinets for each mixer, and automatic controls for beam scales. In addition, brochure explains how Johnson controls give accurate weighing, multiple mixer control, concrete moisture control, and fail-safe operation. *C. S. Johnson Co.*

Circle Service No. 120

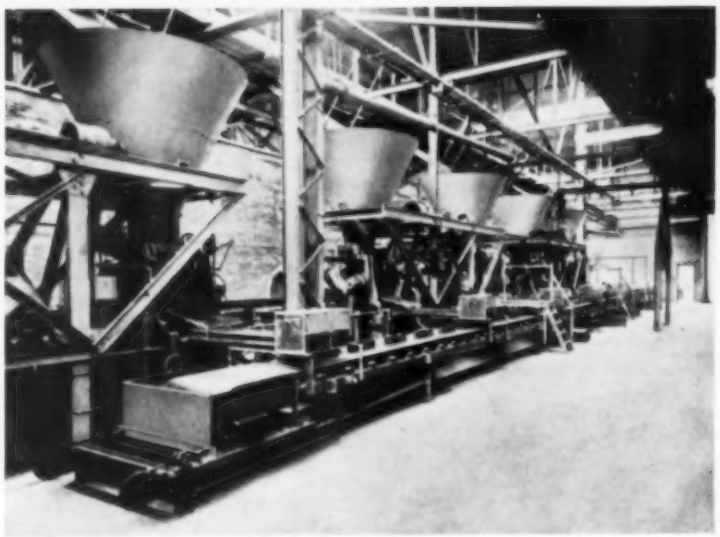
Iso-Jet Firing System—The Iso-Jet system of firing as applied to ceramic kilns and to other process furnaces is described in Bulletin J-1 by Bickley Furnaces, Inc. The principles of operations, along with advantages and typical applications of the Iso-Jet system of firing are described and illustrated in the 12-page bulletin.

The Iso-Jet system is a new system for producing absolute temperature uniformity in a fuel-fired furnace. Laboratory kilns, round bee-hives, and tunnel kilns are all capable of greater precision and flexibility when equipped with Bickley Iso-Jet.

Circle Service No. 121

AUTO*CLAY*MATION 1961

Belt Collects Green Brick from Molding Machines



A Sandvik steel belt conveyor, as shown in the accompanying photograph, is used to collect green brick from a battery of molding machines and to convey them to a transfer point from which they are taken to the kilns.

The steel belt is used in this application because of its ability to withstand abrasion, oils, heat, moisture, and impact without noticeable wear. Steel belt conveyors give as much as 20 years or more service in applications of this type. The conveyors are made of hardened and tempered strip steel especially flattened and trued at the Sandvik mill for conveyor application. They are installed by threading the belt over supporting rolls and terminal drums, pulling the belt tight with a belt stretcher, and welding or riveting the ends together. The terminal pulley at the foot of the conveyor is mounted on a spring loaded carriage which moves back or forth as the belt expands or contracts due to weather changes. Thus, the belt remains under constant tension at all times.

Steel belt conveyors are also used in the ceramic field in handling clays in storage operations, and are particularly good in this service because the clay does not stick to the surface of the belt and is easily scraped off. *Sandvik Steel, Inc.*

Circle Service No. 122

Diamond Blade for Brick Plants

The development of a tungsten carbide bond for diamond cutting blades now enables brick and block plants to use diamond blades economically, according to Alan H. Fleishman, president of Champion Manufacturing Co.

Tungsten carbide, hardest of man made metals, holds the diamonds in place far longer, prolonging blade life. In addition, each segment has a flat bottom, allowing it to be far more securely soldered to the blade core, reports Fleishman.

Champion tungsten carbide bonded blades come in a variety of specifications for economical cutting of all kinds of brick, block and refractories, and in all popular diameters.

Champion has also announced a new construction for their E-Z flex, break-resistant abrasive blades. These blades now have two reinforcing layers to guard against blade shattering. This new process makes E-Z flex blades especially suitable for the heavy duty involved in production cutting. *Champion Manufacturing Co.*

Circle Service No. 123

Automatic Dry Pan Feeder Control

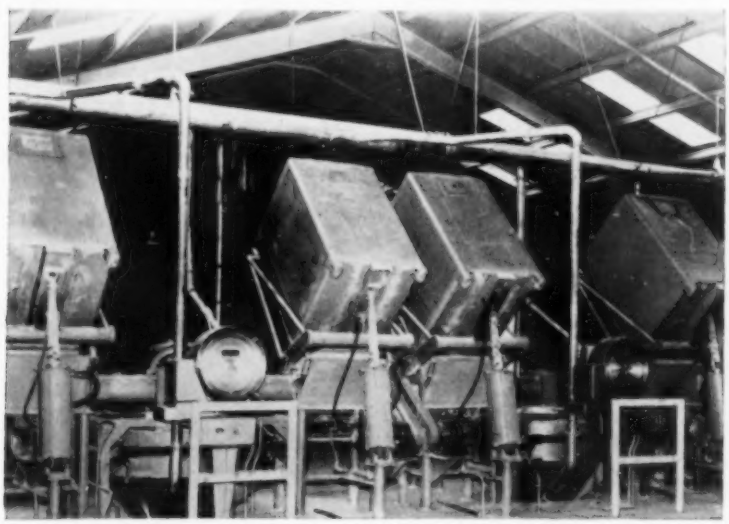
An automatic dry pan electric feeder control for all types of feeders, be it apron, belt, disc, reciprocating, screw or any electrically driven feeder, has been developed by the Bonnot Co.

It is an assembly of electrical circuits serving to stop and start the motor which drives the feeder ahead of the dry pan, and does it automatically and accurately. It is constructed of rugged electrical instruments with no vacuum tubes or other devices affected by change in ambient temperature. There are no switches to operate and the human factor is eliminated completely.

In response to an electrical signal from the dry pan (or other processing machine, the Bonnot Flowmaster stops or starts the feeding unit motors whenever the load rises above or falls below the pre-selected and most efficient operating range—thus maintaining the volume of feed material more uniformly than by hand and at the optimum efficiency rate. *The Bonnot Co.*

Circle Service No. 124

Automatic Batching Provides Needed Flexibility



Heart of the entire batching operation at Harbison-Walker's Fulton, Mo., plant is a Batchmaster electronic control system. An operator using this control panel can set his formulas on the digital control knobs for any particular batch. Once the formulas are set, the system will automatically recycle on the same formula as long as desired.

Controlled by the Batchmaster are the system's suspension hopper scales. There are three having individual capacities of 5000 lbs. with 5-lb. minimum graduations. Two scales handle 3 ingredients fed from a sealed bin, the other, 5 ingredients. A smaller scale, also automatic, has a capacity of 7 lbs., a sensitivity of 1/8 oz. and is used for the sixth ingredient.

Harbison-Walker set up the system with a Howe automatic Mechanoprint printer on each of the suspension hopper scales. The printers record each ingredient's weight in the hopper, its identifying symbol and cutoff time and date. The third scale also records the small ingredient from the net weight scale, although this ingredient may be in such small quantity that it will show no change in the weight figure recorded. Compensation is made for material in suspension.

Because of the many different types of batches being mixed at the Fulton plant, Harbison-Walker needs the minimum flexibility provided by this system as they change their ingredients from one formula to another. *The Howe Scale Co.*

Circle Service No. 125

Truck Crane—A 12-page technical portfolio covering features and capabilities of the recently announced P&H 325-TC truck crane is now available from Harnischfeger Corp.

Incorporated in the 2-color literature is information on such Harnischfeger exclusives as Power Box design; Independent Planetary Boom Hoist; Live Roller Circle; and Torsion

Bar front axle, plus illustrated data on P&H carrier, all-welded frame, and other outstanding *standard* features.

The portfolio for the 25-ton capacity truck crane includes operating specifications of each front end attachment, supported by capacity charts, general dimension drawings, a crane range diagram, cutaway photographs, and on-the-job illustrations. *Harnischfeger Corp.*

Circle Service No. 126

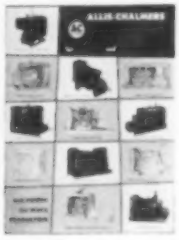
Streamline Your Lubrication Program—The Pure Oil Co. has published a 6 step program to streamline your lubrication program and cut lubricating costs.

The booklet "Industrial Lubricants," explains how Pure Oil representatives can help you by (1) conducting a survey of your plant's lubrication requirements; (2) working out a sim-

ple schedule for each machine to conform with the manufacturers' recommendation; (3) setting up a system of automatic lubricant delivery; (4) organizing and training your lubrication staff; (5) establishing an adequate record system; (6) providing free Pure-Sure analysis of oil samples at the company's Research Laboratories. *The Pure Oil Co.*

Circle Service No. 127

Crushing Plant Power Units—Power units and electric sets for crushing and asphalt plants are described in a new 8-page catalog (BU-768) now available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co. The catalog is complete with pictures of the various units, along with a cutaway view of the Allis-Chalmers "Thousand Series" diesels



and illustrations showing important components of the engine and its combustion chamber.

Tables giving horsepower requirements of the power units and electric sets for crushers and asphalt plants are included, along with photographs showing the two units in action. *Allis-Chalmers.*

Circle Service No. 128

Instrument Catalogs Available—A series of catalogs which describe the complete line of instrumentation and pyrometry equipment available from Honeywell is available to the readers of this magazine. The brochures describe Radiamatic pyrometers, electronik recorders and indicators, and Electronik controller, both electric and pneumatic. *Minneapolis-Honeywell Regulator Co.*

Circle Service No. 129

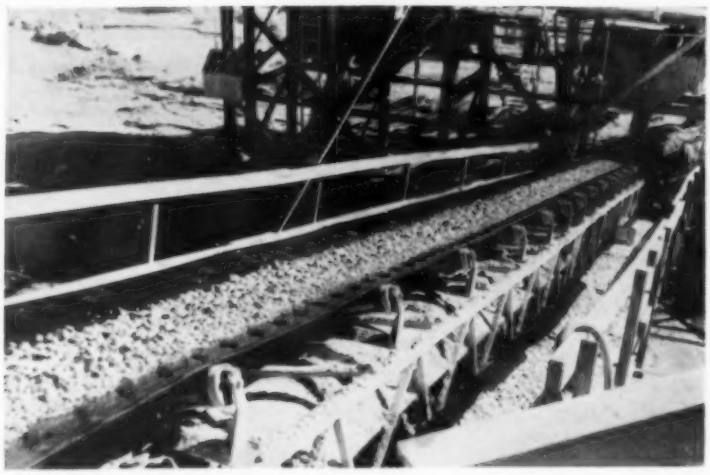
Handling Block Racks—A new low-silhouette, articulating rack handler is described in a bulletin issued by Erickson Power Lift Trucks, Inc. Design specifications are given as well

as a description of how the "Rack-runner" can be used in any type of block plant whatever the degree of automation. *Erickson Power Lift Trucks, Inc.*

Circle Service No. 130

AUTO CLAY MATION 1961

Ribbed Conveyor Belt Handles Wet, Slippery Materials



A practical ribbed conveyor belt has been designed by Raybestos-Manhattan, Inc. to handle wet, slippery or soupy materials such as a mixture of gravel and water up inclines. The chevron shape ribs or cleats prevent the wet material or water from running back even when on an incline since the cleats form pockets that trap the water and hold the material. The belt can be reversed so that the water will drain out of the mixture if desired. *Raybestos-Manhattan, Inc.*

Circle Service No. 131

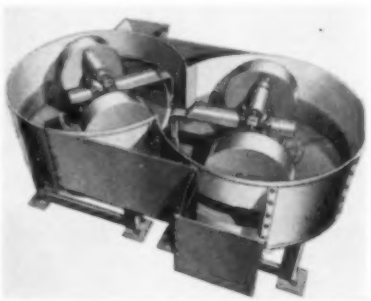
Continuous Muller for Controlled Dispersion

Simpson Mix-Muller Division of National Engineering Company, Chicago, has announced the development of a continuous muller-type mixer. The muller is designed to provide a quality of mix commensurate with that achieved in batch-type mullers at a continuous rate of production.

Called the Simpson Multi-Mull, the new machine is described as a double muller. Materials are subjected to the same action as employed in the manufacturer's line of Simpson Mix-Mullers . . . except that two pans are employed to effect a continued recirculation of materials. This new concept, called Progressive Batch Mulling, is said to provide thorough and controlled mulling of solid/solid, dry/solid or wetted/solid material on a continuous, high production basis.

In addition to high production, these advantages are cited by the manufacturer:

- Improved moisture control
- Elimination of batch accumulating and storage of components.
- Optimum mixing in given floor space
- Little operator attention is required



- Established mulling principle.
- Intensity of mixing and rate of mixing production is variable—under operator's control.

The Multi-Mull is available in six models, ranging in pan retention capacity of from 6 to 120 cu. ft. Hourly production is said to range from 25 to over 2500 cu. ft. of material per hour . . . depending upon material to be prepared. *Simpson Mix-Muller Division, National Engineering Co.*

Circle Service No. 138

Screen Heaters Make Vibrators More Reliable

When trouble just can't happen, why pay stand-by labor to wait for it?

Clay screening used to be plagued by moisture trouble, blinding and build-up. That chance of stoppage kept a man in the screening room to sweep, hammer, or torch off accumulations of damp material. The labor cost and down-time were bad enough, but rough treatment shortened the life of screen cloth for an additional loss.

Converta-Screen electric heating ends the moisture problem, bringing about phenomenal savings in labor and screen cloth. Low voltage resistance heating reduces the surface tension between screen wire and clay particles without drying effect. Moisture content is maintained at desired levels for dry pressing of brick, tile and shaped wares.

Converta-Screen claims to be first with 5 basic betterments in screen heating technique. These pioneer developments are (1) Dura-Flex bus bars; (2) anti-magnetic side rail; (3) grounded circuit; (4) profile-matched extruded parts, and (5) leakproof panel seal.

Three years of service in plants have proved these units. Dura-Flex spring action floats bus bars over the screen, adding no burden or drag on the finely balanced vibrator assembly. Only Converta-Screen does such a neat job of heating any or all decks with elegant modern aluminum components. *Screen Heating Transformers, Inc.*

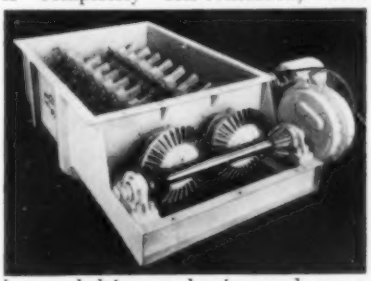
Circle Service No. 132

New Clay Breaker For Chopping of Clays

A new clay breaker, a machine designed for continuous chopping of clay and ore feed in processing systems, has been introduced by McLanahan Corporation.

Constructed to fit under a feed hopper, the McLanahan Clay Breaker continuously accepts feed from the hopper and cleaves it between a series of meshing paddles or each of two paddle shafts. The paddle action further keeps the feed agitated to provide a uniform flow of broken material from the machine to the conveyor. Discharge is from the bottom.

The McLanahan Clay Breaker can be custom-built to most any width or length requirement. The unit illustrated has two shafts, each with thirty 1 1/2 x 3 x 7 3/16 long paddles of manganese steel. The paddle swing is 11-in. radius, with an interlapping overlap of 1 1/2-in. The unit is completely self-contained, with



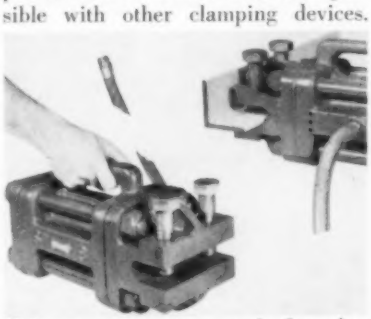
box and drive mechanism and motor mounted on a structural steel base.

Power is provided by a 7 1/2 hp motor. A hydraulically-protected sheave safeguards drive machinery against shock loads—providing full slippage when rocks larger than 8 inches jam the machine. *McLanahan Corp.*

Circle Service No. 133

New Bolt-Bite Mounts Vibrator in Little Space

The Cleveland Vibrator Co. announces a new bolt-bite clamp that mounts the 3" LSF-VG protable air vibrator on small or narrow areas of bins, trucks, foundry core boxes, railroad cars or other objects. Two 3/4" clamping bolts pass through the top of the cast steel jaw for greater pressure on a smaller area than possible with other clamping devices.



This new mounting method makes it possible to attach the heavy duty portable vibrator to structures which previously required a permanent vibrator installation because of limited mounting space.

The bolt-bite clamp fits areas as small as 2 3/4 inches deep and 6 inches wide, according to Cleveland. The clamping jaw can accommodate any depth or width and up to 1 inch in thickness. *Cleveland Vibrator Co.*

Circle Service No. 134

Silicones in Industrial Finishes—A new 16-page bulletin describing silicone-based industrial finishes and their capabilities is available from the silicone Products Department of General Electric.

Designated CDS-294, the publication is liberally illustrated with both black and white and full color photos of comparative testing of silicone high temperature coatings and other coatings under a variety of test conditions as well as in actual applications. *Silicone Products Department, General Electric.*

Circle Service No. 135

Fork Lift Truck—A new 6-page bulletin covering the Hi-Lifter, a multi-attachment fork lift truck designed primarily for outdoor use, has been released by Kwik-Mix Co. Kwik-Mix is a division of Koehring Co.

The bulletin illustrates and describes the base machine in addition to the nine different front end attachments with

which it can be equipped, enabling this machine to handle all materials.

Special prominence is given to the newest attachment—a front end loader—which has a SAE rated 1 1/4-yd. bucket capacity, 8,500-lb. lifting and 6,000-lb. carrying capacity, and 9,000-lb. breakout force. *Kwik-Mix Co.*

Circle Service No. 136

Heavy Duty Air Cleaners—A new line of heavy-duty electronic air cleaners with push-button automatic control is described in a catalog now available from the Westinghouse Electric Corp. The new publication (Catalog 1435) features the company's model PD Precipitron® electronic air cleaners that are suitable for a broad range of industrial and commercial applications. *Westinghouse Electric Corp.*

Circle Service No. 137

KENNEDY PRODUCTS

FOR THE CERAMIC INDUSTRY

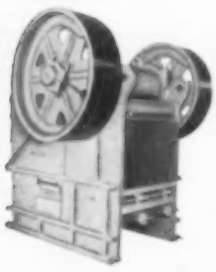
KENNEDY GRANULAR MATERIALS PREPARATION SYSTEM

From the initial raw material to the final blend of ingredients, the KENNEDY system provides the careful preparation, handling and accurate proportioning so necessary to quality ceramic products.

What are some of the advantages of the KENNEDY Designed System?

- Single responsibility for the performance of the entire system.
- Maximum utilization of raw material.
- Production of mixes to optimum maximum density within ±1%.
- Highest reproducibility.
- Complete automation; entire operation easily supervised at one station.
- Higher efficiencies, lower labor costs.

A KENNEDY Granular Materials Preparation System can be designed and built for any raw materials which require reduction, fractionation and blending.

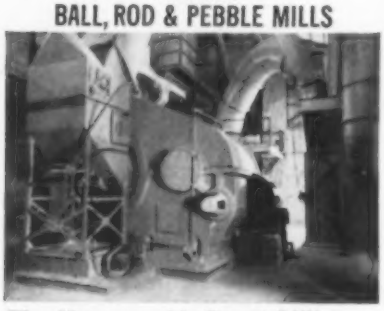


KENNEDY CRUSHERS

KENNEDY Roll Crushers produce high quantities of product within narrow size ranges. KENNEDY Jaw & Gyratory crushers are important for primary and secondary preparation.

Control cubicle for a KENNEDY Granular Materials Preparation System

KENNEDY BALL, ROD & PEBBLE MILLS



The KENNEDY Air Swept Mill provides unusual control over production of fine grinds. The Pebble Mill eliminates metal contamination in grinds down to 25 microns.

KENNEDY SCREENS

KENNEDY open or closed multideck screens provide the close separation of size fractions required for the most effective use of the available raw materials.

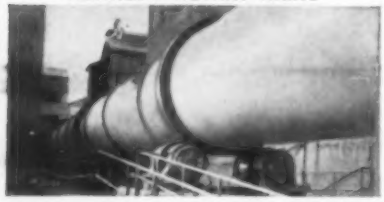
KENNEDY AIR-FLOAT CONVEYOR

The smooth, durable, porous tile conveying surface of the KENNEDY Air-Float Air-gravity conveyor assures low-cost, maintenance-free conveying of granular solids.

• • •

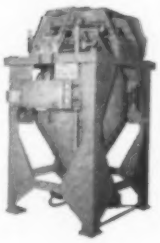
KENNEDY's reputation for sound design, high performance and quality equipment is recognized in many industries all over the world. We invite your request for further information.

KENNEDY ROTARY KILNS



KENNEDY Kilns, Coolers, Firing Hoods and other accessories are important components of many ceramic materials preparation operations.

KENNEDY PNEUMATIC CONVEYING SYSTEMS



These systems handle powdered or granular materials without motors, feed screws or other major moving parts. They are simple, flexible and economical.

KENNEDY VAN SAUN

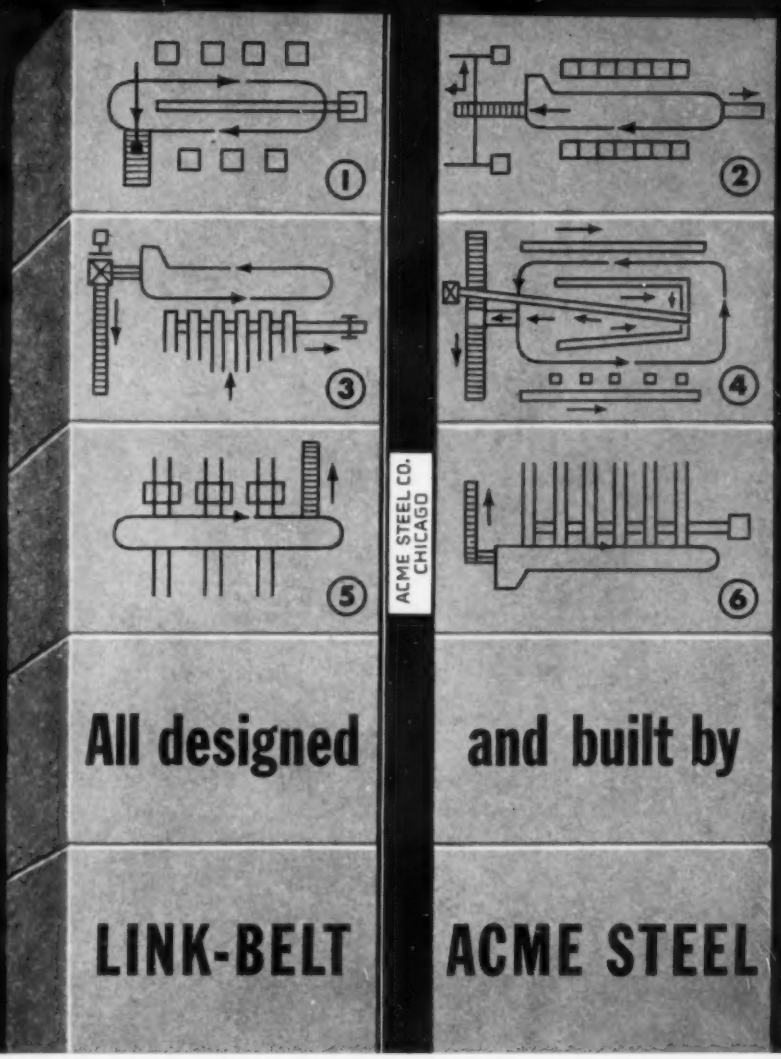
MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod & Ball Mills • Kilns • Kiln Accessories • Dryers • Scrubbers • Screens • Pneumatic & Mechanical Conveyors • Complete Crushing, Lime, Cement & Carbon Paste Plants
KENNEDY Testing & Research Service

Circle Service No. 20

Circle Service No. 28 ⟶



7 different layouts for brick packaging

Flexibility to meet your needs! That's the key to the fast-growing popularity of the Link-Belt/Acme Steel brick packaging system . . . the original, *field-proven* way to package brick mechanically. All seven systems shown here were designed to meet the special needs of the six firms they serve.

Link-Belt and Acme Steel can do the same for you. With more than 80 years of materials handling experience, Link-Belt has the equipment and engineering know-how to tailor a high-production system to suit *any* layout, *any* unloading method. Add to this the packaging experience and skills of Acme Steel and you have brick packaging at its finest.

All firms now using Link-Belt/Acme Steel systems report appreciable savings, tight packages, and more orderly plants . . . all with negligible maintenance. All can package up to 130,000 brick per 8-hour day.

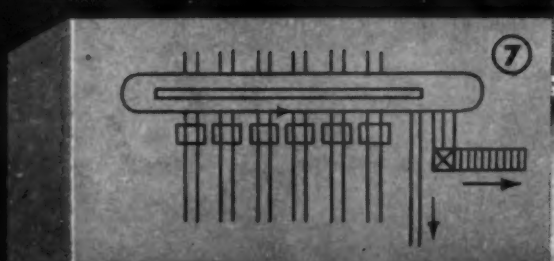
For further information, contact your nearest Link-Belt office. Ask to see our color film. It fully explains the multiple benefits provided by the *original* semi-automatic brick packaging system.

LINK-BELT

MATERIALS HANDLING, PROCESSING AND POWER TRANSMISSION EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,739

DIRECT FROM KILN CARS TO SYSTEM! Alton Brick Co., Maryland Heights, Mo., loads brick directly from kiln cars to this 31-jig Link-Belt/Acme Steel brick packaging system. Jigs are carried smoothly to the strapping machine by a Link-Belt trolley conveyor. More than 120,000 brick are packaged daily.



Six firms can now package 130,000 brick per day.

1. Robinson Brick & Tile Co., Denver, Colo.
2. Henderson Clay Products, Henderson, Tex.
3. Owensboro Brick & Tile Co., Owensboro, Ky.
4. Jova Brick Works, Roseton, N. Y.
5. Alton Brick Co., Maryland Heights, Mo.
6. Nebraska City Brick & Tile Co., Nebraska City, Neb.

SOON TO BE INSTALLED

Robinson Brick & Tile Co. (second machine)
Arketex Ceramics, Brazil, Ind.
Richland Shale Products Co., Winnsboro, S.C.

Acme Steel Products Division
ACME STEEL COMPANY
Dept. BCS-91, 135th St. & Perry Ave., Chicago 27, Ill.

☐ I want to see Link-Belt/Acme Steel Brick Packaging Machines in action. Contact me to arrange for viewing of your color movie.

☐ I want to talk with an Acme idea Man about mechanizing my methods.

Name_____

Title_____

Firm_____

Address_____

City_____ Zone___ State_____

Next?

Anyone for mechanized brick packaging? Six firms are now using the Link-Belt/Acme Steel system. All have doubled to tripled former production, with lower labor costs in the bargain.

Henderson Clay Products is doing even better. They purchased their second machine over a year ago. And Robinson Brick & Tile Co. will have their No. 2 machine in operation within a few months.

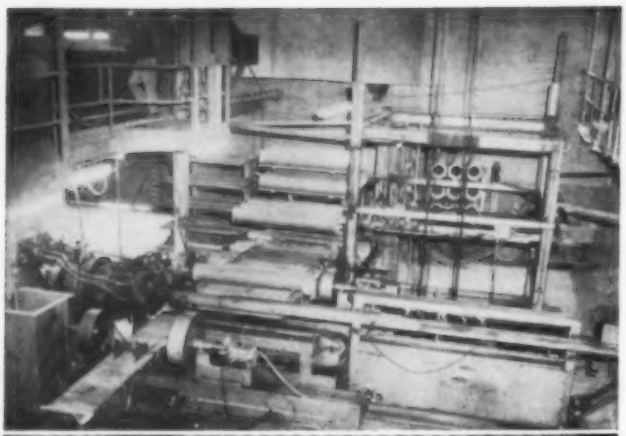
Here at last is a proved packaging method that doesn't lag behind kiln output. In seconds, brick are strapped into packs of 100, ready for loading by mechanical methods. No wonder the list is growing. Next?

ACME STEEL **IDEA LEADER IN STRAPPING**

Circle Service No. 29

Time and cost shortcuts engineered

by HENDRYX

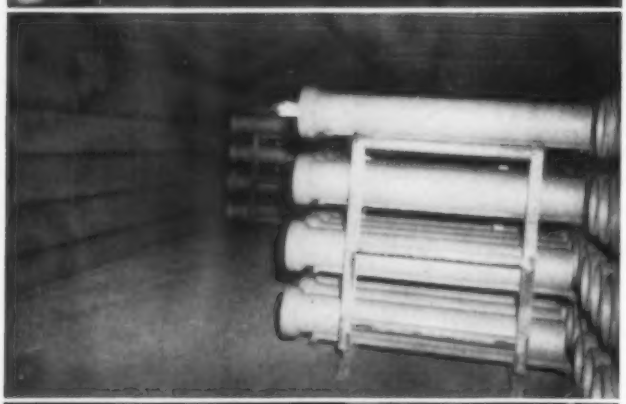


Pictured at the left is one of the manufacturing rooms of the Cannelton (Indiana) Sewer Pipe Company, designed by Hendryx. In sequence, beginning at the foreground are the auger machine and Pearne and Lacy equipment consisting of the former and off-bearer, the automatic finishing station and the automatic rack loader.

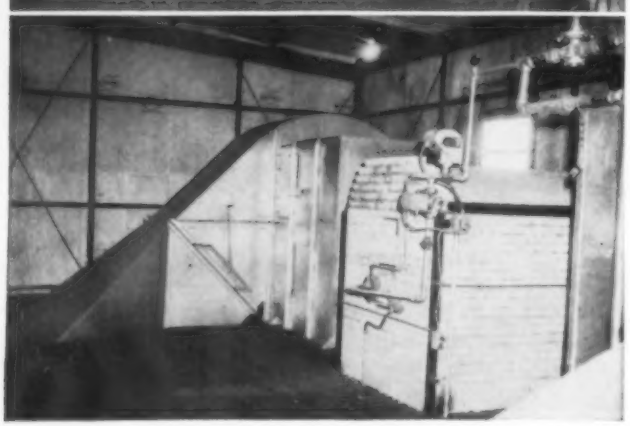
Hendryx designs for time, space and operating cost economy, at the same time stepping up production quality.

Ten inch sewer pipe is dried in 20 hours in this Hendryx-designed batch type dryer as compared to days or weeks in older style operations. Drying time for all pipe sizes may be anticipated at about one-sixth that of conventional practices.

For vertical drying the forced hot recirculated air flows from the steel grating floor to ports in the oven roof. The center circular vent bleeds off a controlled volume to maintain the desired humidity and permit replacement with fresh hot dry air.



Horizontal drying is faster due to freer air circulation. Four to 8″ pipe sizes are dried in 14 hours. Combination rooms afford either horizontal or vertical drying. Ports in side walls are opened and roof and floor ports are closed. Horizontal drying requires racks and rack loading equipment as seen in top picture, and P&L automatic rack unloaders can afford further savings.



Each drying room is equipped with a gas-fired, heavy duty air-heater supplying two mixing chambers and two fans. Makeup air is constantly proportioned and introduced at the mixers to maintain adequate moisture pickup capacity.

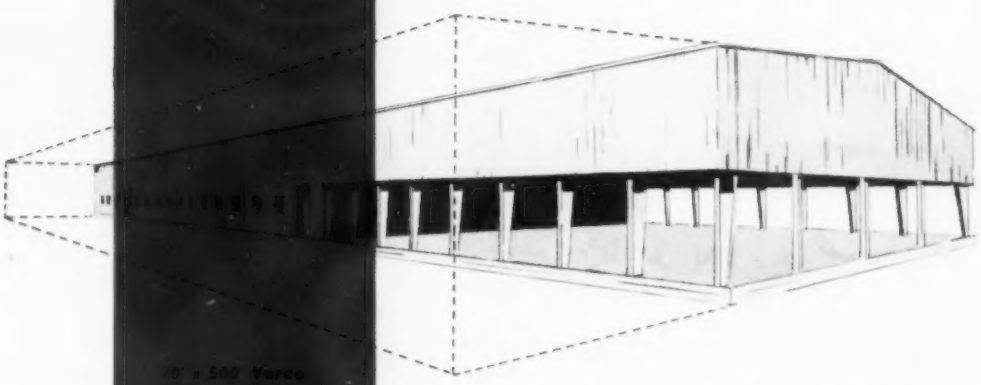
Hendryx engineering for ceramic manufacture can provide you with a complete new plant or a single installation such as drying oven and handling equipment. Hendryx developments and design are proven cost and time savers. Your inquiry for ceramic plant or facility modernization is invited.

DWIGHT B. HENDRYX AND ASSOCIATES, INC.
6621 Darlington Road
PITTSBURGH 17, PA.

Eastern representative for Pearne and Lacy Machine Co., Inc

Circle Service No. 26

Built for Today . . . Planned for Tomorrow . . . a Varco Building for Alliance Clay



80' x 500' Varco Uniframe Building recently completed for The Alliance Clay Product Company plant at Winslow Junction, New Jersey.

Varco Uniframe Construction creates a strong, all-welded framework designed to give the Alliance building years of maintenance-free service.

The Varco structure above was built to serve today's needs . . . designed to accommodate tomorrow's expansion.

At present, a single tunnel kiln is being constructed within the building. However, realizing that future demands might well require an additional kiln, Alliance asked for a building that would allow expansion in the easiest way possible. With this in mind, Varco engineers, working in conjunction with Harrop Ceramic Services and Alliance officials, designed a low pitch (1:12) Uniframe structure with a 22' wall height.

To withstand the heavy loading and snow and water pressures that will come to bear on a roof with such low pitch, Alliance's building was covered with Varco high-ribbed metal paneling and mastic sealed at all joints. This exclusive Varco panel provides extra strength without extra cost.

As shown by the dotted lines, expansion from this structure would be a simple, economical process that retains the modern lines of the original building. It would also avoid the bother and expense of gutters and down spouts that would be necessary if an additional rigid frame unit was constructed.

For over a decade, Varco has been specializing in buildings for the brick and clay industry. Your building problems are our business. Write or call for complete information on Varco Uniframe Buildings . . . the better building for less.

Varco R. G. VARNER STEEL PRODUCTS, INC. • P. O. BOX 781
PINE BLUFF, ARKANSAS • JEfferson 4-6030

Circle Service No. 30

Motorized pitless transfer car with fluid coupling and power feed cable reel. No pits or bridges needed, gives easy, shallow truck cross-over, for uninterrupted work processing. Shown in use with 25,000 lb. load of glazed tile at the Claycraft Company, Columbus, Ohio.

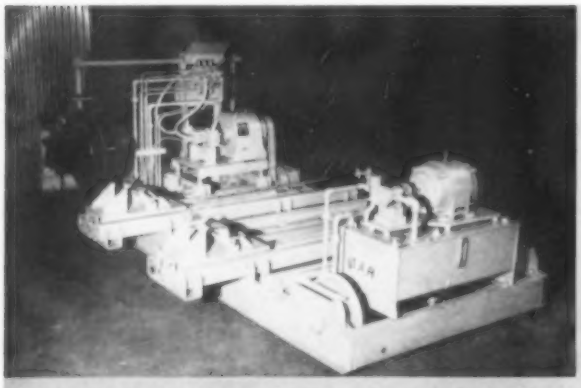
STAR

offers all types of TRANSFER CARS

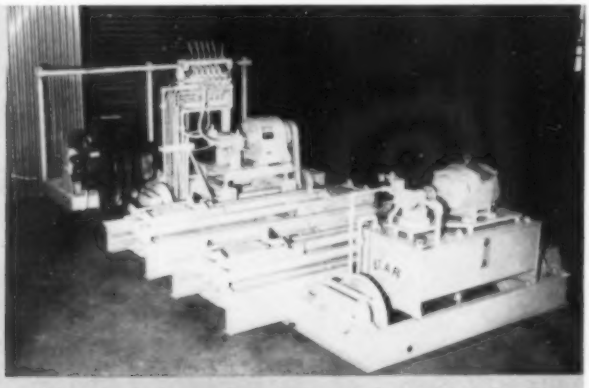
custom-designed

to your specific needs

Whatever your transfer car needs may be, Star can furnish them, *custom-designed* with you in mind! These sturdily-built units are designed for hauling kiln cars weighing up to 100,000 lbs., in a variety of types and with a wide choice of accessories. Both pitless and pit-type models are available, either manual or motorized. The propel drive can be arranged for fluid coupling, hydraulic motor or D. C. motor components. For added ease of handling, Star transfer cars can be furnished with winch and sheave assemblies, telescoping hydraulic car propellers or side cars. Dimensions, capacities, accessories and other details in accordance with your job requirements.



Motorized pit-type transfer car, twin track, hydraulic drive, telescoping push-pull propellers, with power conductor reel.



Motorized pit-type transfer car, twin track, hydraulic drive, with direct action hydraulic propellers, with power conductor reel.

STAR Foundry and Machine Co., Inc.
NEW LEXINGTON, OHIO • Phone Fireside 2-2377

Write or phone for details TODAY!

ENGINEERS • DESIGNERS • BUILDERS of Transfer cars...Electrified vibrating screens...Polyester jointing systems...Hydraulic or mechanical car moving systems...Grey iron castings...Special machines

Circle Service No. 23

NEWS from Dow Corning

How this brick was sold

STORY OLDSMOBILE, INC., LANSING, MICH. FREEMAN AND SMITH, AIA-ARCHITECTS

Silaneal® meets specifications for controlled suction rate

The plans for this modern glass-and-brick auto showroom specified an attractive high suction rate, sand mold brick. In addition, the walls must be as strong and as leak-proof as possible, as well as attractive. Much depended, the architect knew, upon the way the brick performed in laying; on how well its suction rate could be controlled.

The popular method is to soak the cube of brick at the job site. But he knew a better way. He knew how to save the contractor time and money; how to eliminate the need for soaking at the site. And most important: he knew how to get a uniform, controlled suction rate on all brick surfaces where needed. To achieve these advantages, he added one more specification: the brick must be plant-treated with Silaneal brand silicones to reduce its suction rate to between 10 and 20 grams.

Why Silaneal? Lay an ordinary high suction rate brick on wet mortar and considerable water is immediately sucked out of the mortar. The mortar dries too quickly and shrinks, leaving hairline cracks at the interface of mortar and brick. Result: a poor bond, a wall that may leak. Now lay a brick treated with Silaneal on wet mortar. Silaneal treatment reduces initial water absorption of high suction brick; allows mortar to dry slowly and thoroughly. The bond is better, the wall stronger.

Wall leakage reduced. Transverse pressure tests — and tests simulating wind-driven rain — have demonstrated repeatedly that wall sections built of high suction brick treated with Silaneal show definite improvement in strength and leak resistance over similar, but untreated, brick.

Brick stays clean. Silaneal makes the brick surface water repellent so dirt washes away with rain. And when water can't get into the brick, efflorescence is also minimized. Another important point: the brick are left free to "breathe" because Silaneal treatment does not obstruct passage of air or moisture vapor.

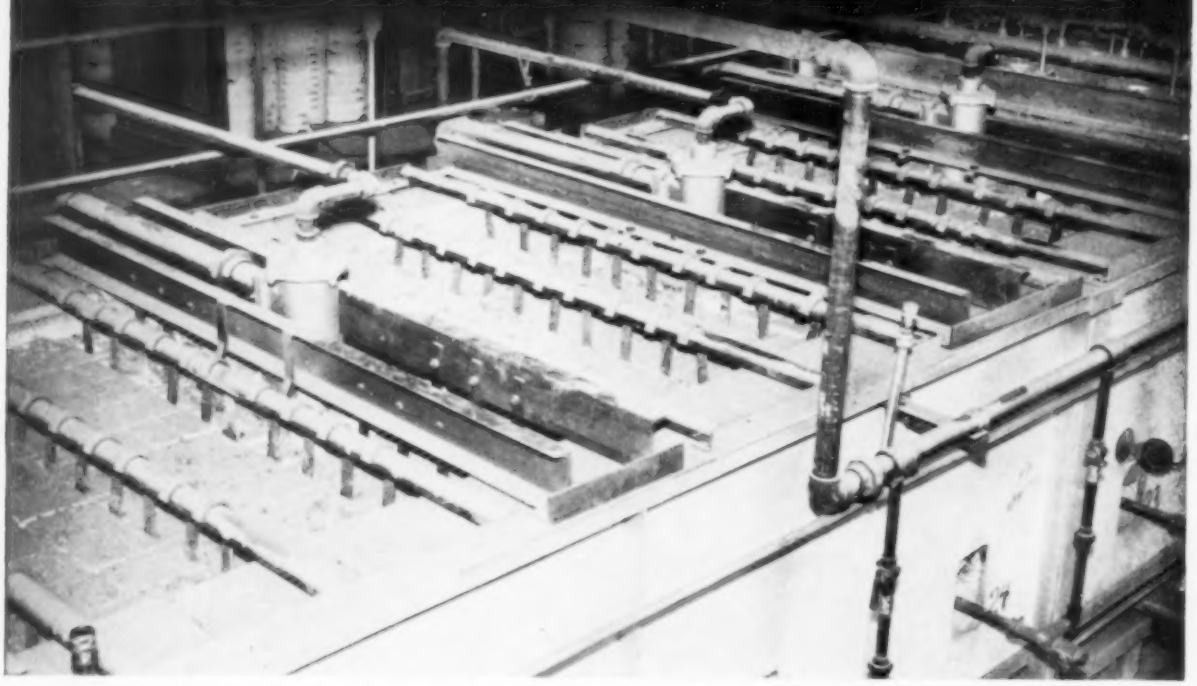
More and more architects are specifying brick treated with Silaneal to achieve stronger, drier, better looking walls. You, too, can meet these specifications — sell more brick, better brick — by applying Silaneal. Write to Dow Corning Corporation, Midland, Michigan, for full details.

SILANEAL®
keeps brick clean

Dow Corning CORPORATION
MIDLAND, MICHIGAN

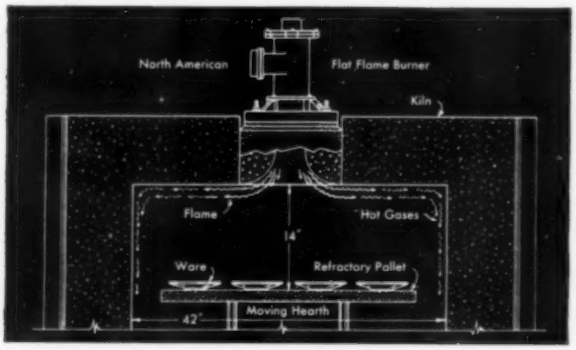
Circle Service No. 32

Fast Firing with North American Flat Flames



Shenango China, Inc. is glost firing hotel dinnerware in 80 minutes thanks to fast even radiant heating with North American Flat Flame Gas Burners in the firing zone roof of this automated kiln. Flames do not touch the ware —just provide radiant heat for ***high speed production.*** Decoration with every color, even gold, has been successful.

Test kiln in North American's Application Laboratory—used in checking out the feasibility of the fast firing system. Flat Flame heats roof and walls by convection.



They then heat ware by a soft radiant glow that is uniform but intense. First cost and maintenance are low because only one burner is necessary to produce a large radiant heat source.

NORTH AMERICAN COMBUSTION and Hydraulic Controls

For engineering information, call your nearby North American Combustion Engineer or write for

The North American Mfg. Co.
Cleveland 5, Ohio

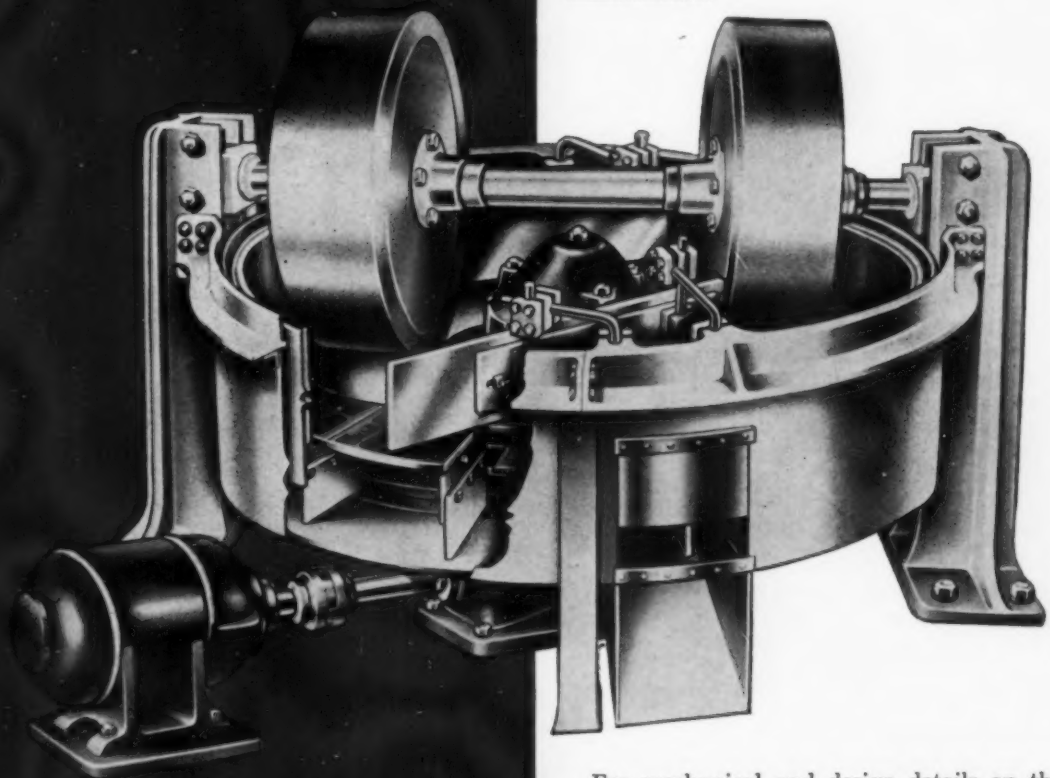
Circle Service No. 25

Grinding at its best!

the new High-Efficiency

CLEARFIELD DRY PAN...

Totally-enclosed direct motor drive assures lower production cost... easier maintenance



CLEARFIELD
MACHINE COMPANY

CLEARFIELD, PENNSYLVANIA, U.S.A.

Clearfield's newest addition to its wide line of grinding machines for the refractory and ceramic industries has all the features that have made the Clearfield name famous for durability and efficiency in service . . . plus design and construction improvements that assure even greater grinding and production economies.

The new Model 900 comes in 8½ or 9-foot diameters and features a direct motor underdrive. With this method of drive, the worm engages a gear attached to the underside of the main revolving pan bottom; thus power is applied at a point very close to the grinding load . . . less power is needed, vibration is reduced, and since all equipment is accessible from the floor, maintenance and replacements are easier and quicker. Worm and gear operate in an oil bath and are completely enclosed in a dust-and-oil-tight cast-iron housing.

Crushing rolls are wide faced and spread far apart to give maximum crushing area per revolution . . . high production is achieved without excessive pan speeds, thereby reducing vibration, prolonging life of the machine. The ample screen plate area quickly discharges the correctly-ground material to the conveyor for screening or storage. All parts are durably constructed for long-life service with minimum maintenance.

For mechanical and design details on the new Model 900 – or any of our all-purpose grinders – just write for our technical bulletins. No obligation, of course.

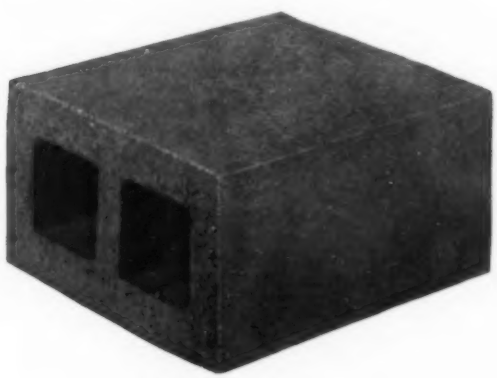
Pacific Coast Representative: Fernholtz Machinery Company
8468 Melrose Place, Los Angeles 46, Calif.

Circle Service No. 31

Photo shows PACO 4½" x 8" x 9" car tops set on end and used as perimeter block. Top deck is constructed with 4½" x 8½" x 18" PACO car tops. Each corner has a 7" x 8½" x 9" cored corner block. Perimeter and corner blocks are filled with lightweight insulation.

PACO CAR TOPS can cut your replacement costs as much as 50% — and increase your profits! The reason is simple. Paco Car Tops are made from the mineral pyrophyllite. This unusual, superior raw material permits the manufacture of thinner wall, larger core car top that is lightweight, stronger and highly resistant to extreme thermal shock.

PACO CAR TOPS do not have a softening point below actual fusing point, providing greater resistance to hot load deformation. The result is better, more efficient production. Paco Car Tops are easy to handle and install, and simple to replace individually as needed.
There is a PACO engineer as close as your telephone—or write for complete information!



SEE OUR CATALOG IN
Ceramic data book

NORTH STATE PYROPHYLLITE COMPANY, INC.

Telephone CYpress 9-1441 **Greensboro, North Carolina**

OTHER PACO PRODUCTS INCLUDE: • Paco Plastic • Pacocast • Paco H.T. Cements • Paco Fire Brick Mortar • Paco Side Car Brick • Paco Fire Brick • Paco Ladle Lining • Paco Heatzone Compound

Circle Service No. 18

NARCO

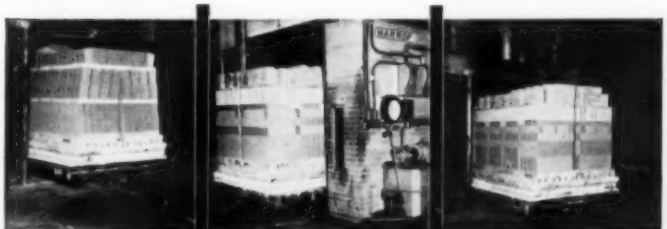
FINGER-TIP CONTROL Narco and Harrop collaborated to develop this well-organized layout of control panel for new Harrop kiln at North American Refractories Co. plant, Curwensville, Pa. With 2-zone automatic, full-proportioning control chart-recorded, operator also takes hourly readings of other temperatures throughout the kiln. Multi-point electronic indicator brings all thermocouple leads to one convenient, easily accessible location. Air motor operates automatically controlled damper in exhaust. Together with air-lock, this maintains constant draft conditions throughout kiln.

NARCO's new HARROP KILN fires up to 40,800 9" equivalents daily with stubborn Penna. clays

Pennsylvania clays are tough to fire. High carbon and sulphur content make oxidization difficult. Yet Narco's two Harrop kilns at Curwensville produce a high-quality line of refractories from these stubborn clays. Production includes dry press, stiff mud repress and hand-made shapes.

Narco's first Harrop installation, completed in 1953, consisted of a 172′ dryer and a 393′ kiln. To keep up with sales demand that far exceeded initial expectations and outgrew capacity, Narco again turned to Harrop for their present, enlarged facilities. Harrop doubled the size of the existing dryer to 344′. This gives plenty of dryer capacity to serve the original kiln **plus** an additional Harrop kiln, 476′ long, which fires up to Orton cone 18. This new kiln produces up to 40,800 9″ equivalents in 24 hours, despite the hard-to-oxidize clays. At this production level, design capacity is exceeded by 36%.

For the dryer, kiln or plant design to give you efficient, profitable production, consult Harrop. Our 37 years of proven engineering and construction experience is available to help you plan your new installation, without obligation.



HARROP DRYER gives easy control of temperature and humidity during the various stages of the cycle, to dry special shapes such as the rotary kiln shapes shown being discharged from the dryer.

ON THE WAY- Mixed setting of brick and shapes enters charging end of new Harrop kiln. Note hydraulic pumping unit for pusher at right. Natural gas is now being used with oil standby, for firing up to Orton cone 18.

READY FOR STOCK- Refractory brick and shapes leave open-end kiln in continuous motion. Because of efficient, profitable performance of both Harrop installations at Curwensville plant, Narco has new Harrop-designed facilities in operation in its new Farber, Mo. plant.

HARROP

TUNNEL KILNS • DRYERS • PLANT DESIGN

Harrop Ceramic Service Co.

35 EAST GAY STREET, COLUMBUS 15, OHIO

Western Representative: Fred J. Ford, Room 413, 35 E. Gay St., Columbus 15, Ohio. **Southwestern Representative:** Process Engineering Service, 6936 San Pedro Ave., San Antonio, Texas

HARROP PRECISION FURNACE CO. (division of Harrop Ceramic Service Co.), 3470 E. Fifth Ave., Columbus 19, Ohio . . . laboratory, industrial and school furnaces.

HARROP . . .

Practical Ceramic Engineering, Put Profitably to Work

Circle Service No. 34

Brick

Pipe

Tile

LOWER COST PACKAGING

with the GRIPLOCK

Brick, Pipe and Tile Packaging System

The Griplock clay products packaging system utilizes the new "Brick-Pak" specification round wire strap—the guaranteed *non-stretch* strap with superior toughness and strength.

"Brick Pak" hot dip galvanized wire *will not rust.* It allows safe handling and shipping even after months of storage under adverse weather and ground conditions.

"Brick Pak" round wire strapping, the heart of the Griplock packaging system, is economical. The completed brick or tile unit cost averages 10% to 20% less than the flat band components of a comparable package, *with pipe unit cost savings of 30%.*

GRIPLOCK DIVISION

C. Tennant, Sons & Co., of New York
100 Park Avenue, New York 17, N. Y.

FREE DEMONSTRATION AT YOUR PLANT

Griplock engineers will demonstrate the economical Griplock system at your plant site, utilizing standard packaging arrangements or special variations to meet your exact needs for transport by rail or truck. Write or phone: Griplock Division, C. Tennant, Sons & Co., of New York, 100 Park Avenue, New York 17, New York.

Mobile Griplock Unitizing Jig for rapid brick packaging with "Brick Pak" wire strapping.

Loading Griplock 4-pier truck cubes for delivery to job site 100 miles from plant.

Two 5-pier, 500 brick, Griplock packages for rail shipment.

Circle Service No. 22

a Bickerstaff Fork* will handle

Normans

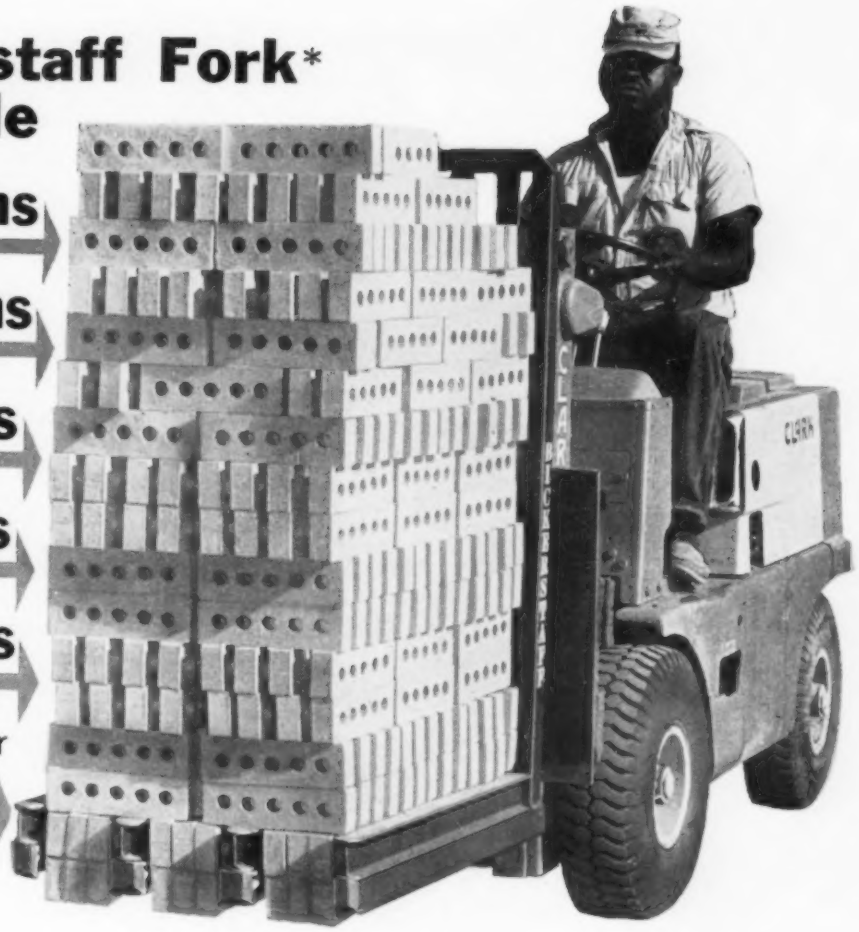
Romans

Norwegians

Jumbos

Utilities

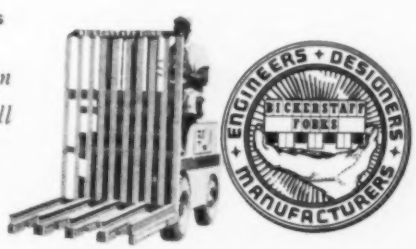
and any other specials



You name 'em and Bickerstaff will move 'em. Just tell us your need. Our engineers will go to work — and soon — handling "specials" will be just a routine matter for you. With Bickerstaff on the job — your handling costs will be greatly reduced. You will speed the flow of brick in and out of inventory — and to truck or freight car. No matter what your handling needs may be — Bickerstaff can help.

* M-M MINIMUM MAINTENANCE ON ALL FORKS

Get the complete "Profit-Making Story" on brick handling. Call, wire or write. We'll send it to you immediately.



BICKERSTAFF
INCORPORATED
P. O. BOX 1178
COLUMBUS, GEORGIA
CYpress 8-0455

ENGINEERED
FORK LIFT TRUCK
ATTACHMENTS

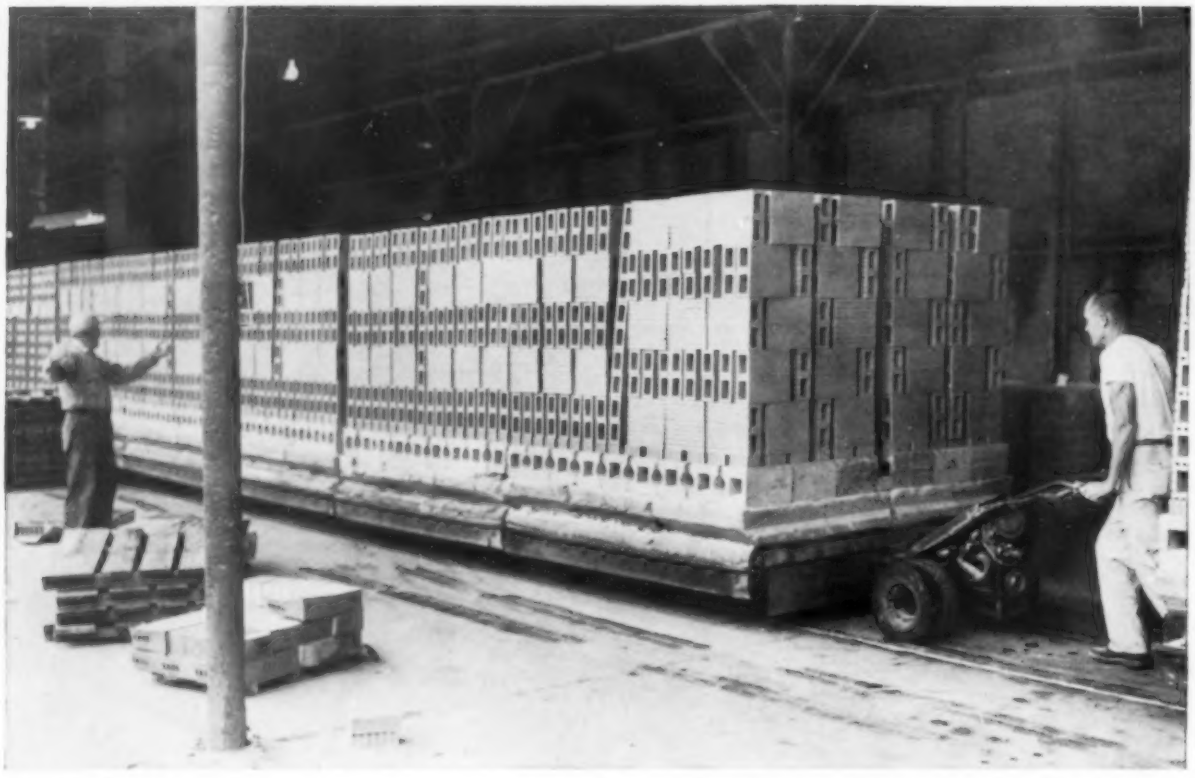
REPRESENTATIVES THROUGHOUT THE U. S. AND CANADA

West Coast Representative - WALTER C. STOLL & SONS
5028 Alhambra Avenue, Los Angeles, California

Circle Service No. 21

GRAVELY TRACTORS

P. O. BOX 660
DUNBAR, W. VA.



GRAVELY MOVES KILN CARS ECONOMICALLY—SAFELY!

Loaded Weights Over 100,000 Pounds!

Brick and ceramic plants discover every day that Gravely power saves time and money!

Man-hours are cut because it takes only one man and a 6.6 HP Gravely Tractor to start and move loaded Kiln Cars weighing over 100,000 lbs.!

NEW KILN CAR TRACTOR!

Gravely's new Kiln Car Tractor provides ultimate convenience for Kiln Car Moving. Many specialized features, manufactured exclusively for use in brick and ceramic plants, are incorporated in modern design.

ECONOMICAL OPERATION!

Save money three ways! The initial purchase price of the Gravely is lower than any single-purpose equipment mover. Maintenance costs are low, too.

Gravely has the POWER and SLOW SPEED essential for moving fragile ceramic products safely! No costly damage due to jolting or jerking movements.

Finally, Gravely offers your choice of 30 year-round maintenance Tools—all operated by the one GRAVELY TRACTOR!

ATTENTION!

Service no problem. Authorized Dealers stock parts, sell and SERVICE Gravely. No down time waiting for parts or service.

ILLUSTRATED FOLDER!

Descriptive four-page Kiln Car Folder illustrates methods, gives User comments, partial list of present Users and describes new Kiln Car Tractor. Ask for "Kiln Car Folder."

PROOF—FREE DEMONSTRATION!

Get absolute proof of Gravely's capabilities by the one best method—Free Demonstration!

We demonstrate in your plant, under your conditions, positively no cost or obligation.

NEW INDUSTRIAL CATALOG!

"How to Cut Costs" catalog illustrates the Gravely's many attachments and multiple uses. Write for free copy and ask for FREE demonstration today.

GRAVELY TRACTORS P. O. Box 649-J, Dunbar, West Virginia

Circle Service No. 24

NOW...YOU CAN SOLVE THESE AND OTHER LAYOUT PROBLEMS...

- Waste Space
- Mounting Labor Costs
- Late Materials
- Lack of Flexibility
- Cluttered Areas
- Too Long Hauls
- Inaccessibility
- Poorly Integrated Service Areas

with this 314 page manual

SYSTEMATIC LAYOUT PLANNING

a new book by Richard Muther, *(with a foreword by Allen H. Mogensen)*

Richard Muther is an internationally recognized authority on facilities planning. He has helped leading companies in England, Sweden, Norway, and Switzerland, in addition to U.S. and Canada. He is widely known as a lecturer, and is the author of *"Production Line Technique"* and *"Practical Plant Layout"*.

Every manager and technical specialist needs this guide to better layouts. It is the first book specifically designed to show him how to obtain the most efficient layout for his situation . . . in production, office, or service areas.

- Details procedure from job-assignment to installed layout
- Practical examples of successful layout plans
- Complete sets of actual working forms

Piecemeal Improvements • Overall Changes • New Facilities

Here's what outstanding authorities say:

Allan H. Mogensen, Director of Work Simplification Conference says: " . . . *operating people and others not trained as engineers will be able to go into the business of layout planning quickly and effectively.*"

Clarence F. Brewster, Chief Industrial Engineer, Butler Manufacturing Co. says: "*The fresh, organized approach in SYSTEMATIC PLANNING* will *become one of the major aids for layout planners throughout industry . . . This new book is obviously based on practical experience.*"

Robert S. Rice, nationally known Professional Engineer and Editor says: "*After reading this book one wonders why it wasn't done before; it's such an obviously helpful manual.*"

CONTENTS

- The Systematic Layout Planning Pattern
- The Technique of Product-Quantity Analysis
- Optimizing the Flow of Material
- Diagramming Flow and Activity Relationships
- How to Establish Space Requirements
- Making a Space Relationship Diagram
- Modifying Considerations and Practical Limitations
- Evaluating and Selecting the Layout
- Location Considerations
- Installing the Layout
- Operating and Managing Layout Projects

And here is what the business and industrial press have to say:

Factory magazine: "Here is an authoritative and complete how-to book on plant layout. It is organized to take the reader in sequential steps from assignment to installation."

Modern Materials Handling: "At last an organized approach to layout planning . . . affords the best chance yet to control handling costs."

examine this valuable book

FREE for 10 DAYS

We will send you a copy of SYSTEMATIC LAYOUT PLANNING for 10 days' leisurely reading without any obligation. Review the contents carefully and examine the practical bound-in forms to guide you in every step of a layout project.

At the end of 10 days, if you aren't thoroughly convinced of the worth of the book, simply return it.

If your request for a free examination is received right away, you may keep it for the special prepublication price of only $9.50.

Don't miss this opportunity. Send no money. Simply mail the free examination coupon today.

SPECIAL 10 DAY APPROVAL ORDER

INDUSTRIAL EDUCATION INSTITUTE (Publications Division)
Cahners Building, 221 Columbus Avenue, Boston 16, Mass.

Yes, I want to examine Systematic Layout Planning. If I am not completely satisfied, I will return it in 10 days for full cancellation of charges. Otherwise, I will remit the pre-publication price of $9.50 plus a few cents postage.

Name ..... Title .....

Company .....

Street Address .....

City, Zone & State .....

(CUT ON DOTTED LINE)

Senate Consideration Next

House Passes Depletion

WASHINGTON, D. C., AUGUST 21—The House of Representatives today passed by more than a two-thirds majority vote H. R. 7057, a bill to prohibit the Internal Revenue Service from the retroactive application of the Cannelton decision in depletion allowances for brick and tile. Of the 63 Republicans and Democrats who spoke before the vote, there was no speaker who favored the Treasury Department's position and not a singe vote was cast against the bill. The bill now goes to the Senate for consideration.

The above news report, while it tells briefly of the victory of the clay products industry in the House of Representatives, does not begin to convey the long, determined and continuing struggle to have the Internal Revenue Service deal fairly with the makers of brick and tile.

Working closely with the men on Capitol Hill who support the clay industry's stand are a group of unsung, hard-working men headed by Neill Boldrick, chairman of the Structural Clay Products Industry Depletion committee. The group has been devotedly working for the past 10 years to bring about victories in the courts and the House passage of H.R. 7057.

Douglas Whitlock of the law firm Gravelle, Whitlock, Markey & Tait in Washington, D. C., has been counseling the Committee at all stages. Valuable assistance also has been given the Committee and Congress by Frank C. Erwin, attorney from Austin, Texas.

Ways and Means Approves

Five days before H.R. 7057 successfully passed the House, the Ways and Means Committee unanimously approved the bill which was introduced by Congressman Frank Ikard of Texas, and sent it to the full House.

The Ways and Means Committee report reviewed the long history of the Internal Revenue Service's stand against the clay products industry going back to 1951 when it fought vigorously to apply the depletion allowance to the raw clay product. In over 50 court cases, the IRS lost each time. Finally, in 1957, the Supreme Court refused to review the cases and the IRS issued its now-famous Tax Information Release No. 62 which, in effect, sustained the viewpoint of the industry and the courts.

IRS Reverses Itself

The Committee report went on to show how the IRS "followed the position expressed in that release and on that basis did in fact settle many depletion claims in prior years in the case of brick and tile clay." Then, following the Supreme Court's decision in favor of IRS in June, 1960, the IRS reversed itself and announced that it would use the principles of the Cannelton case defining the first commercially marketable product which was not the end product, but the ground clay at some intermediary point in the production process.

The report further states that the Committee concluded from a full examination of the record that taxpayers in the brick and tile industry were "justified in placing full faith and credit on the long line of court cases upholding percentage depletion on the finished product in the case of brick and tile on the official statement issued by the Internal Revenue Service that it intended to follow the principles laid down in these court cases, and the fact that the Internal Revenue Service had, in fact, settled many cases on this basis."

Bipartisan Support

With the Ways and Means Committee's unanimous support of H.R. 7057, the bill faced the House on August 21. Speaker after speaker on both sides of the political aisle rose to support the bill and rallied to the defense of the brick and tile industry.

Representative Ikard, who introduced the bill, spoke forcefully in its favor. He warned of the hardship that retroactive application of the Treasury interpretation of the Cannelton case would work. "To retroactively impose a tax in these cases would have serious consequences in the clay and shale industry because it is traditionally an industry of many small independent businesses which do not have large financial resources to fall back upon in the event of an adverse determination of their tax liability for a number of past years," he argued.

Representative Oren Harris of Arkansas acted as chairman of a Congressional steering committee and introduced into the record a resolution signed by over 200 members of Congress which upheld the clay products industry in its stand. The bipartisan list included members of the Senate as well as the House of Representatives. Great assistance was given this effort by venerable Representative Carl Vinson of Georgia who has consistently championed the brick and tile industry's position.

Congressman Jackson E. Betts of Ohio, a stanch supporter of the bill from the start, paid tribute to his colleague, Ohio Representative Frank T. Bow, who "cooperated

Bill

with all of us in securing favorable consideration of this bill." Representative Betts went on to point out that the legislation "simply says that the Government must keep its word with these small companies and collect taxes as it said it would."

Representative Frank Bow of Ohio was secretary of the congressional steering committee and first called attention to the plight of the clay industry in a speech in the House of Representatives. During debate on H.R. 7057, he pointed out that he represents in his Ohio congressional district more clay workers than any other member of the House and that many of these workers' jobs are threatened unless the law is passed. "Unless we have relief from this taxation, many of these businesses will be bankrupt throughout the country," he stated.

Strongly Criticizes IRS

Congressman William H. Avery of Kansas was particularly strong in his criticism of the Internal Revenue Service. Recalling that this is the third year this matter has been before Congress, he suspected that there is a "determination in some department that the will of Congress is going to be circumvented." He said that the display of support for the bill on the floor of House "will make it crystal clear to the Internal Revenue Service what is the intent of the Congress." He labeled the IRS position "inequitable" and claimed that it "places an undue financial hardship on the taxpayers who relied on the technical information bulletin."

Representative William G. Bray of Indiana, another important force in the passage of H.R. 7057, told his colleagues, "This bill, if it becomes law, will remedy a great wrong to the clay industry."

Over and over, congressmen who

(*Continued on page* 92)

They Fought The Good Fight

Neill Boldrick

Douglas Whitlock

Rep. Jackson E. Betts

Rep. Frank T. Bow

Rep. William G. Bray

Rep. Frank Ikard

Rep. Carl Vinson

For Ceramic Building Block

What Do Raw Materials

In the first installment in this series on building block, Mr. Moffitt pointed out that the term "clay block" may be a misnomer, since the formulation and fabrication of such block are not necessarily dependent on clay. In this second article he considers the apparent reluctance of structural clay manufacturers to get into the block business and suggests that cost of manufacture may be a factor. Read on for some interesting and perhaps surprising facts about the cost of raw materials for this operation.

By ROY B. MOFFITT

North Carolina State College
Raleigh, N. C.

Introduction. For several years, the structural clay industry has been toying with the idea of producing a ceramic building unit that would have the same (or similar) geometry as that common to the concrete block competition. The competition from concrete block has been recognized as a definite, but by no means permanent, threat to the building market that the structural clay industry previously dominated. However, only three ceramic plants, now in actual production, have answered this threat with a product or products.

It is a proven fact that the ware manufactured in these three plants are inherently superior to concrete block simply because they are ceramic. Why is the structural clay industry so afraid of getting back a part of the market that they once enjoyed? The inroads that concrete block have made and still are making in the building industry directly concern the pocketbook. If there is a more sensitive spot in man's nature than his pocketbook, then years of history have failed to uncover it.

The only possible answer to such delay by the ceramic industry is the disease "brickitis." A cure for this malady certainly can be nothing more than the technical knowledge necessary for the successful manufacture of a ceramic block, and a manufacturing cost that will put the competition (concrete block) in an uncomfortable position. It is automatically assumed that the aid and comfort of the concrete block competition is not of immediate concern to the structural clay industry.

Basic Approach

The author's previous paper entitled *Why Not Call It Ceramic Block* (Brick & Clay Record, August, 1961) clearly describes in simple ceramic terms the basic approach to compounding a practical and successful ceramic building unit that could be mass produced. No mention of raw material cost was made in that paper; however, such cost will be considered in the following discussion. The combination of the previous paper that described the pyrochemical and physical approach to making ceramic building units of concrete block geometry and the following discussion that will show a way to reduce the cost of making these units, should be enough to convince the industry that it is time for all those who are bothered by concrete block competition to do something about it.

Prior Art. The three plants that are now actively engaged in the production of ceramic building units, the same or similar size as concrete block, are currently using some form of expensive prepared aggregate as all or the major constituent of their composition. It is here that the cost of the block can be reduced. A recent prime cost study indicated that the firing cost of concrete block size ceramic units is generally less per block than the cement cost per block in a concrete building unit of the same size. Hence, there is no immediate need to concentrate effort in order to reduce the firing cost.

Virtual Automation

Machinery, commercially available to manufacturers of both ceramic and concrete block, can be purchased that will almost completely automate a block production assembly line. Therefore, it is not the forming or handling phase that currently needs the cost reduction thinking. This cursory survey of the essentials of block manufacture certainly points out that the area of raw materials holds the most promise for cutting the cost of ceramic block manufacture.

There is one thing that can be common to the production of both ceramic and concrete block of the same size, the forming machinery, and it is here that the manufacturing similarity of the two products usually ends. A ceramic unit, by definition, has to be fired, and it is in this stage of manufacture that problems start and the superior physical properties of the resulting ware are developed. However, since a ceramic unit has to be fired, raw materials that might be suitable for the manufacture of concrete block may or may not be suitable for a ceramic block.

Firing a structural ceramic unit demands that the ware be compounded from suitable raw materials. This firing produces a ceramic product which is inherently superior to concrete products of similar size. Where the concrete block industry can use most any locally produced

Table II—Raw Material Cost and Physical Properties of Various Ceramic Blocks

Composition Number	Raw Material Cost Per Block	Weight lbs	Shrinkage Percent	Gross Compressive Stren. psi	Absorption Percent
1	$0.0635	19.2	1.2	1480.7	11.09
2	$0.0472	20.0	0	1190.0	10.14
3	$0.0408	20.4	0	1200.0	11.09
4	$0.0245	24.8	0	1705	7.11

NOTE: The cost per block includes the cost of the Additive "B" binder—¼% by weight of gross composition components.

Cost?

aggregate as a source of raw materials, the ceramic manufacturer must select his raw material aggregates with particular care in order that the ware formed from these materials can be subsequently fired. It is the same old story . . . . you cannot get something for nothing!

Raw Materials

Raw Materials. As it has been previously mentioned, the three ceramic plants that are currently producing ceramic building units of the same or similar geometry as concrete block are using *prepared* aggregate and/or aggregates. This costs money! Generally speaking, prepared lightweight aggregate cost $5.60/ton F.O.B. plant. At this writing, one of the plants currently producing ceramic block is seriously considering replacing some of its more expensive prepared aggregate with a low cost ($1.50/ton) previously crushed raw material. The results of making this substitution are favorable from the standpoint of the physical properties of the fired ware, and this raw material substitution also promises an appreciable decrease in the cost of manufacture, approximately 1c per 5.33″x8″x16″ unit.

A 1c per unit reduction in cost for a plant producing five thousand units per day calculates to a yearly savings of a little more than $18,000. This savings alone can pay the salary of a rather high-powered engineer or business executive. Therefore, pennies per unit may be the basis for this discussion, but these seemingly insignificant pennies can and do amount to an appreciable sum of money over a year's time.

One basic mental obstacle that most interested ceramic block investigators have is the misconception that clay is somehow a mandatory part of the composition of the ceramic units being discussed. This is a drastic error! Do the manufacturers of concrete block use any clay? They do not! Then why do the structural clay manufacturers have to use clay? This use of clay may be what is called "brickitis."

It has been said many times, but always in confidence and off the record, that the brick manufacturers will some day have to get out of the brick business and into the ceramic business. This manufacture of concrete block size ceramic building units may be the first step out of the brick and into the ceramic industry. However, this initial step into the ceramic business is predicted on the basic concept of substantially eliminating clay from any composition used to make concrete block size ceramic building units. If clay can be all but eliminated without too much pain, then engineering effort will show how to make a practical ceramic unit that promises to compete successfully with concrete block.

Clay Eliminated

Now if it can be assumed that clay, but not necessarily sericite phyllite or semiplastic shale, has been essentially eliminated from the basic thinking of making ceramic block, the problem arises as to what ceramic raw materials are readily available that are less expensive than those currently being used in the manufacture of large size ceramic building units. The answer to that question is rock.

Normally, crushed rock "screenings," which are substantially —6 Tyler Standard Mesh in particle size, are commercially available in most any locality for a base price of $1.50 per ton F.O.B. quarry. This price, when compared to the cost of $5.60 per ton of prepared expanded aggregate, suggests that this may be a partial answer to the problem of lowering the cost of a large size ceramic unit which has the same or similar size as concrete block.

Weight, Price Differentials

The unit weight of lightweight aggregate is at best only one-half that of heavy rock aggregate, but the price of lightweight aggregate is almost five times as high as heavy aggregate. Usually, structural clay plants cannot count on being located close to sources of lightweight aggregates that can be used successfully in compounding a dimensionally stable ceramic block. It is a most fortunate circumstance when a structural clay plant is so geographically located where both "high" and "low" P.C.E. expanded aggregates are commercially available. Such a chance location is in opposition to Murphy's Law which states that if anything can go wrong, it will. Therefore, rock used as either a part or all of an entire ceramic block

Table III—Raw Material Specifications of Ceramic Block Compositions in Table II

Composition Number	Refractory Phase Parts by Volume	Refractory Phase P.C.E.	Binder Phase Parts by Vol.	Binder Phase P.C.E.	Water Parts by Vol.	Firing Schedule
1	5 (Lightweight)	14-15	3 (Lightweight)	5-6	1	Cone 5
2	5 (Lightweight)	14-15	3 (Lightweight)	4	1	Cone 4
3	5 (Heavyweight)	13-14	3 (Heavyweight)	5-6	1	Cone 5
4	5 (Heavyweight)	13-14	3 (Heavyweight)	4	1	Cone 4

Table IV—Unit Weights of Various Ceramic Block Aggregates*

Name of Aggregate	Type	*Unit Weight lbs per Cubic ft.	P.C.E.
Tuff-Lite	Sintered Clay	71	14-15
Solite	Expanded Shale	71	5-6
Stalite	Expanded Shale	79	5-6
Weblite	Sintered Clay-Shale Mixture	65	7-8
Trap Rock	Heavyweight	98	4
Rhyolite	Heavyweight	98	12-13
Unweathered Shale	Heavyweight	98	5-6

*Typical sieve analysis of aggregates shown in Table I.

composition can consequently be considered seriously.

In most cases, the use of rock in such a ceramic block composition will be the result of the unavailability of a pyrochemically acceptable (P.C.E.) aggregate. Available lightweight aggregate may be "high" in P.C.E. or it may be "low." The use of rock aggregate then may be designed around the P.C.E. of the lightweight aggregate that is available. The physical properties of ceramic block in which rock aggregate has been used for either the bonding or more refractory phase of the ceramic block composition will be given later. These compositions incorporate substitutions of rock for either the bonding, the more refractory phase, or both phases of the composition.

The immediate question that presents itself, if rock can be successfully used as all or any part of a ceramic block composition, is the one that concerns the final weight of the fired unit. This is a question to be considered and it will be discussed in due time. However, ignoring the weight question for the moment and taking first things first, the question to answer now is; are there rocks commercially available that will make a successful and practical ceramic block composition? The answer is yes!

Raw Material Specs

Before answering specifically the above question, let us briefly review the specifications that ceramic block raw materials, both light and heavyweight must have in order that concrete block size ceramic building units can be mass produced using conventional or slightly modified concrete block machinery for forming and currently used tunnel kilns for firing the ware. To form a ceramic block using such machinery, the raw material mix must be harsh or gritty. To fire the resulting ware, the particle size of the ceramically objectionable minerals (quartz, lime, etc.) must be cryptocrystalline.

An aggregate must have a certain P.C.E. in relationship to the firing schedules and kilns available in order to be called a bonding phase material, and an aggregate must have a minimum P.C.E. approximately eight cones more refractory than that of the bonding material to qualify for the major portion (the more refractory phase) of the composition. The more refractory phase suppresses linear shrinkage and deformation as a result of load during firing.

Forming and Firing Differ

Both the forming and the firing of a ceramic body that is substantially composed of aggregate are radically different from the same processes involving a ceramic body that is essentially clay and shale or mixtures thereof and is subsequently extruded or dry pressed. Currently, the extrusion method is the most popular for forming clay. The resulting extruded body possesses an intimate particle-to-particle contact, and is correspondingly dense as compared to a more porous body, which may be formed on concrete block machinery from a mixture that is compounded essentially from harsh, gritty aggregate.

There is a general empirical relationship between the P.C.E. of a clay raw material and the subsequent firing schedule of an extruded or dry pressed body made from such material. Generally, the P.C.E. of a clay is determined, then that P.C.E. minus 6 to 10 cones indicates a possible range of cones (time-temperature relationship) that will normally result in fired ware of approximately 10% absorption. This general rule only pertains to dry pressed or extruded clay bodies.

Balancing Composition

Contrary to the P.C.E. rule pertaining to dry pressed or extruded clay bodies, there is another general rule, proposed by the author, that pertains to ceramic bodies compounded essentially of aggregate. This rule uses the P.C.E.'s of the different components (refractory and bonding phase aggregate) as a method of pyrochemically balancing the composition. The balance is desirable in order to make a dimensionally stable unit, low firing shrinkage and insignificant deformation as a result of load during firing. This rule states that approximately $\frac{3}{8}$ by volume of the composition can consist of bonding materials; however, the balance of the composition must be made up of materials that have individual minimum P.C.E.'s approximately eight cones more refractory than that of the bonding materials.

As previously stated, this latter portion, approximately $\frac{5}{8}$ by volume, is designated as the more refractory phase. If these composition ratios and P.C.E. specifications are met, then the firing schedule can be so designed that the cone achieved by the kiln schedule is essentially the same as the P.C.E. of the binder phase aggregate. Generally, this will result in a body that has essentially zero shrinkage and no hot load deformation if a stand of 40 inches of ware is not exceeded. It is important to remember that in the composition just discussed, there is no clay, but possibly weathered sericite, phyllite and/or shale. The introduction of clay or weathered shale into the composition modifies this rule and severely aggravates the forming of the ware.

Properties of Rocks

The questions that now should be discussed concern the specific properties of different rocks, and whether these properties meet the physical and pyrochemical specifications (P.C.E.'s) previously described. A general rule that would apply to the P.C.E.'s of different rocks for either the bonding or the more refractory phase materials is important. In

(*Continued on page* 75)

How to Fast-Fire Kilns

The only way that any process can produce more product of better quality at less cost and maintain these gains is to refine it from an art into a science. All these processes follow basic laws so that it is necessary to take all measurements which will define the limits of the process. Once this is done, interpretation of the results is possible and then automatic control from one or several of the primary measurements may be used to stabilize the variables. Therefore, to achieve "fast firing" it is necessary to take more measurements than are now generally being taken. It is further recommended that these measurements be recorded so that the data will be as accurate as possible and not left to human interpretation.

Once the interrelated effects of all variables are studied, control should be installed. Otherwise you will accumulate a file of very interesting records but the information will not be used to operate the kilns. This has been our experience on many processes where new measurements were used but control was not added. When operators were left to interpret the data and make adjustments it generally was not used at all.

By R. E. POCOCK

Clay Products Application Engineer
Bailey Meter Co.

The most tangible measurement of kiln performance is product appearance. The poor pieces are most generally shown to you before you hang your hat up in the morning. There are very slim facts to go on for a solution, and they happened yesterday. Most of your information must be gained from opinions. This is like trying to solve an algebraic equation having 10 variables with only one or two of the variables known. Assumptions must be made to arrive at an answer. This fact makes the answer only correct within the limits of the original assumptions.

Specifically you are faced with making as high a percentage of grade A product as possible. Your various tools are cones placed in the ware, and some temperature and draft measuring instruments, but with all of these you still can be handed a piece of ware that doesn't fall into this A classification. To get your good ware percentage as high as you have it now, an extra amount of air is maintained over optimum firing conditions to take care of the worst clay condition.

Figure 1 is a curve of basic laws governing combustion. As excess air increases, the temperature at which the fuel is burned decreases. This excess air does not have to come through the burner to have this effect. An every day illustration is the soak zone in a tunnel kiln which is located next to the cooling zone. Some days maximum fuel is fired into the zone and the temperature still will remain below set point. If an oxygen reading were taken it would be high showing quite a bit of air was coming from the cooling zone. If the same amount of air was put in at the burners the resultant temperature would be the same. Therefore, percent oxygen has a direct relation to products of combustion temperatures.

This paper differentiates between different places for excess air measurement. This is important because they must be recognized in order to control them. For example, a hot zone premix burner with a 6 to 1 air-gas ratio firing through an air inspirating Venturi may result in a 2% oxygen analysis under the car in a tunnel kiln. An analysis at the crown could give 15% oxygen, the

(Please turn page)

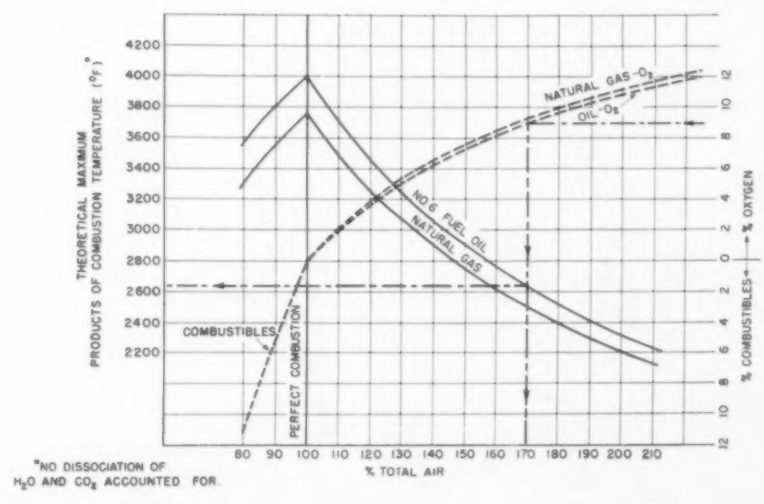


Fig. 1. Products of combustion temperature vs. % total air. Example: 9% O_2 with oil equals 170% total air and 2650° F combustion temperature.

From a paper presented at annual meeting of American Ceramic Society, Toronto, Ontario, April 23-27, 1961.

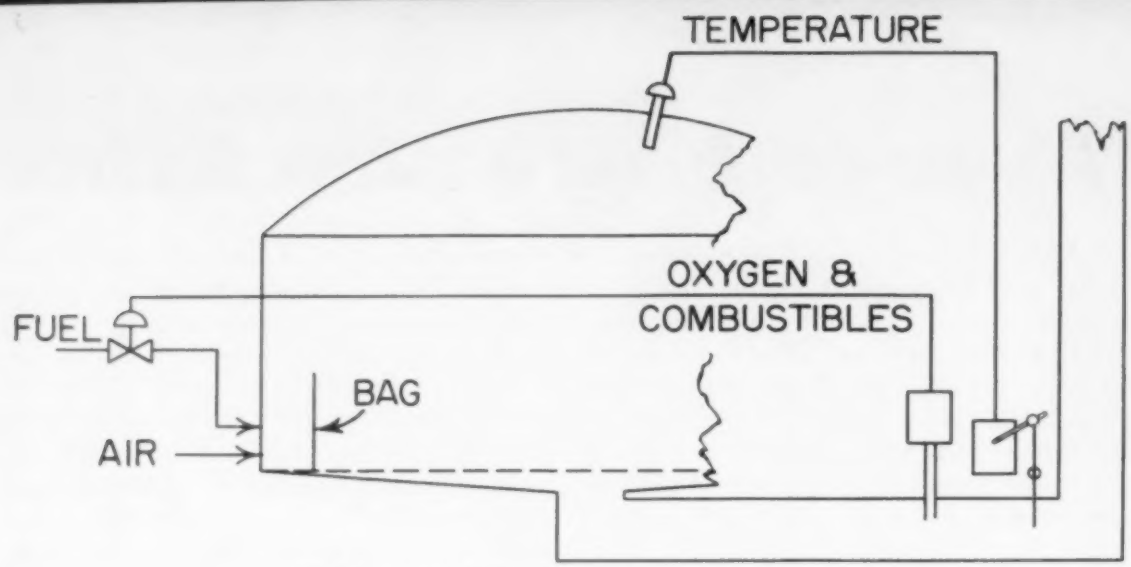


Fig. 2. Programmed temperature control with inspirating burners.

extra air coming down the kiln having added the extra 13% oxygen.

A second example is an excess air burner in the oxidizing zone. At the burner we have 10.8% oxygen for 100% excess air. An analysis in the crown may show 2% oxygen equal to 10% excess air. The difference is due to oxidizing of the impurities since the products of combustion from the burners have passed through the ware.

Anyone associated with kilns realizes that from a product point of view, it is very hard to get too much excess air because as we go away from the combustible limit the higher the excess air is. Combustibles occur: (1) in the furnace zone or soak period when the rich premix is not supplied with additional air to completely burn, or (2) in the oxidation zone, or oxidation period when the carbon, sulphur and other impurities coming out of the ware are not supplied with air rapidly enough to keep from causing a reducing atmosphere around the ware itself. Because there have been no continuous reliable measurements of the atmosphere in the ware chamber in the past, it has been less expensive to waste some fuel and time rather than risk losing some ware. This is particularly true because the ware is a tangible piece of evidence that something is wrong. Therefore if we can safely reduce the normal excess air carried in the kiln we have a situation where you can have your cake and eat it too since this saves fuel and reduces firing time.

As an example, let us take a typical down draft periodic kiln with inspirating burners firing natural gas as shown in Figure 2. The normal way of firing these is to have the stack damper wide open at the

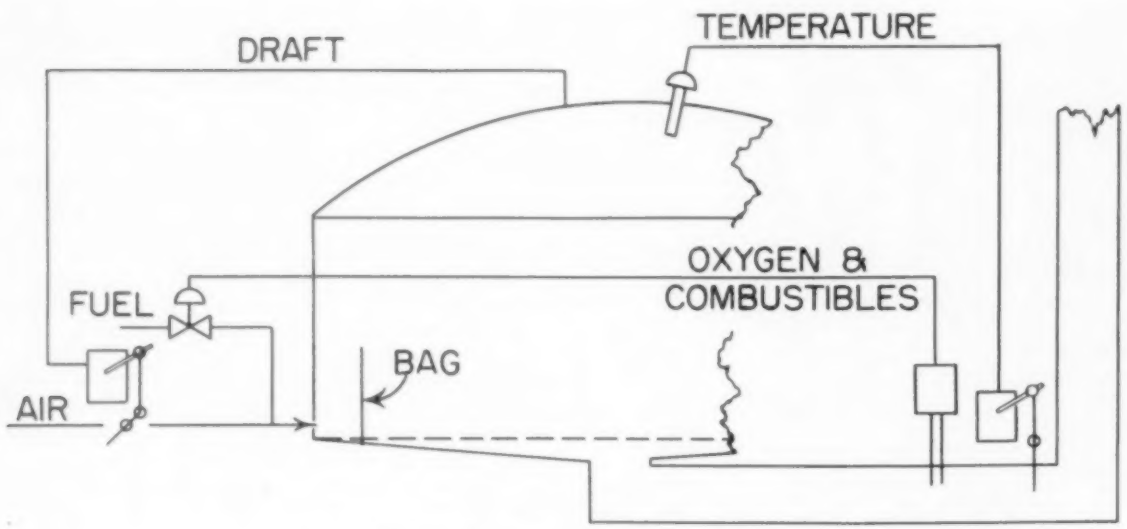


Fig. 3. Programmed temperature control with sealed burners.

start since this is the time when you have minimum draft. This is left open normally until after the oxidation period and then it is adjusted toward the close position as the kiln gets hotter. Fuel is controlled manually by the kiln operator. Combustion air is adjusted directly by the position of the stack damper.

Now, if we measure the crown temperature and control the stack damper directly from it, we in effect then are controlling combustion air to the periodic kiln. In a tunnel kiln the combustion air is controlled from temperature with the fuel being controlled from a fuel-air ratio device such as a zero governor. This same method is used on many combustion processes firing gas. The reason of course, is that you will never put any more fuel into the furnace than you have air to burn it properly. The air flow to each inspirated burner cannot be used to ratio the fuel; however, a flue gas analysis of percent oxygen in the gases at the stack can directly control fuel input.

Stack Damper Wide Open

When lighting off, crown temperature would not be up to the programmed point desired; therefore, the stack damper would be wide open. The oxygen analyzer would be set to maintain say, 3% oxygen at the kiln outlet and this would provide just enough fuel at the burners to maintain this. Thus any variation in the combustion air available due to changes in ambient temperature, density and varying stack drafts would be completely under control by the oxygen recorder. This one measurement would take care of all of these variables.

At this point there would be no combustibles present for if there were, a higher oxygen set point should be maintained. This is the reason that it is wrong to say a particular percent oxygen is good for all kilns. The oxygen set point can only be determined by the measure of combustibles being zero at the percent oxygen set. As the dome temperature rises it would then start adjusting the stack damper so that the rate of temperature rise was in accordance with the desired program. I might stop here to say that while we might be maintaining 3% oxygen at the kiln outlet if we were measuring the oxygen at the burner it may be 2% depending upon the infiltration. Also, during the oxidation period the oxygen at the burner may be 10% while still only 3% at the kiln outlet. The difference in oxygen percentages is the quantity necessary to oxidize impurities due to a change in clay.

Actually the system in a sense is self adjusting in that the more infiltration there is, the less excess air there would be at the burner. Thus the hotter flame, when it did reach the places where the air was infiltrating, would be at about the same temperature regardless of whether the air came in at the burner or through other openings. The tightness of the kiln is a variable with time and obviously if most air came into the kiln through leaks and not at the burners, the flame temperature could be excessive. But before this point is reached, it would be obvious to the operator due to the visual checks made of the inside of the kiln. When the stack damper moves toward the closed position from a temperature signal it decreases air, thus the oxygen in the stack gases decreases. The oxygen analyzer sensing this, decreases fuel input to bring the oxygen back to set point.

We therefore maintain a stable products of combustion temperature per Figure 1 since percent oxygen remains constant. As the temperature of the ware increases the carbon and sulphur begin to oxidize, these take additional oxygen from the products of combustion and this is shown on the analyzer as a decrease in the total available at the stack. This then automatically reduces the fuel input at the burners to maintain a constant oxygen at the stack. With the air kept the same, and the fuel reduced, the excess air at the burner increases. Thus extra excess air is available during the oxidation of the ware.

As soak temperature is reached, the crown temperature closes the stack damper to a minimum point. Fuel would also be cut back through

(*Continued on page* 88)

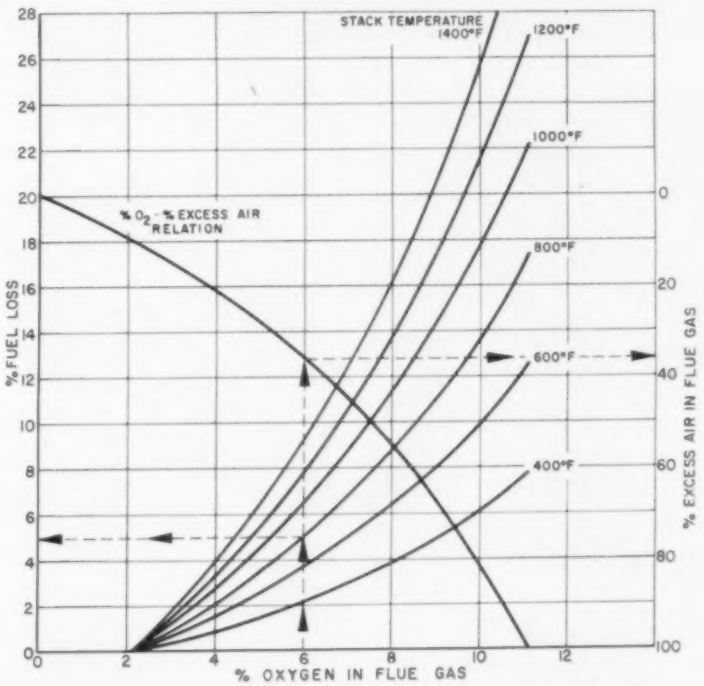


Fig. 4. Fuel savings vs. excess air for several flue gas temperatures for hydrocarbon gaseous fuels as compared to operating with 10% excess air.

ECSA Meeting Best Yet

See Big Gains for

Three of the speakers on the opening session pose for the Brick & Clay Record camera: They are, left to right, Ernest Gruenwald, technical services manager for Lone Star Cement Co.; Lucas Pfeiffenberger, technical consultant for the Expanded Clay and Shale Association, and Richard Miller, division sales manager of Lehigh Materials Co.

Enthusiastic forecasts that expanded clay and shale lightweight aggregates can look ahead to years of consistent and substantial growth highlighted the midyear meeting of the Expanded Clay and Shale Association, held July 20-21 in Allentown, Pa. More than 60 men were on hand for the 2-day sessions, which attracted one of the best attendances in the history of ECSA. President Melvin Cruzen of Lightweight Aggregate Corp., Detroit, presided.

Miami Beach was chosen as the locale of the association's annual meeting to be held Friday and Saturday, January 12-13, 1962, just prior to the NCMA convention in the Florida city.

Expanding Markets

Three speakers kicked off the ECSA meeting at the Americus Hotel, Allentown, on the opening morning. The first was Richard E. Miller, division sales manager of Lehigh Materials Co., Tamaqua, Pa., producers of Lelite, who described the expansion of markets for lightweight aggregate in the East Coast area and the widening field of uses for the product in a paper, "Selling Lightweight Aggregate in the Smaller Sizes." He traced Lelite's beginning and research back to 1929, when the Lehigh Coal and Navigation Co. began investigating outlets for the quality shale produced as a by-product of anthracite. This led to a pilot plant installation in 1941 and erection of Lelite's present plant in 1948 at a cost of $1,600,000.

The first few years were "trying" ones, Miller said. Getting architects acquainted with the advantages of lightweight aggregates and convincing "skeptical" producers were two main challenges. Gradually, Miller said, there came acceptance in the big metropolitan areas such as New York. Engineers, architects and builders found the trowel trades more amenable to handling lighter weight masonry units; because 8-inch lightweight units may weigh as much as 15 pounds less than heavyweight, they came to appreciate the considerable savings possible in footing and frame cost of multistory buildings using masonry for backup and partitions. He noted that nailability is an economy producing feature of lightweight units, making attachments and inserts less expensive, and they can be cut or ground on the job less expensively, also. The lightweight units have smaller heat loss, which in areas with heat plants that operate some eight months a year has much significance.

Miller said, "Today lightweight expanded clay or shale is specified without question by architects throughout the 8-state area we serve. We have finally come into our own. For the past four years, we have sold out our production of Lelite. Of our 1961 tonnage, 60% will go into lightweight structural concrete and the remainder into block, precast and specialty sizes. For 1961, it looks very much as if we will be in short supply on all sizes." Miller noted that two of the most recent projects where Lelite structural concrete was employed are the Guggenheim Museum in New York City designed by Frank Lloyd Wright, and the George Washington Bridge.

Sand Size

The sand size, or 3/16" x 0 material, which is the smallest sizing and which accounts for about 10% of this typical producer's annual output, is and traditionally has been the hardest size to sell, Miller said. However, besides its use by precast producers, it has been successfully promoted in specialty uses such as refractory work and refractory castables. The sand size has won a limited market for horticulture use—most local florists are using it in their flower beds to "start" the young plants. It is also being promoted with increasing effectiveness for sludge-drying beds at sewage treatment plants.

The main outlet, however, for sand-size lightweight aggregate, the Lelite sales head said, has been on running tracks. "Architects have taken to this application most enthusiastically and we have been averaging 15 to 20 tracks per year. We take our sand and mix it two parts Lelite and one part approved loam for the top dress of the running track. In the past year, we have resurfaced the running tracks of many leading colleges and universities in the East."

Lucas E. Pfeiffenberger, technical consultant for the association, gave a report on American Society for Test-

L. W. Aggregate

Mr. and Mrs. David Groves, Shalite Co., and secretary of ECSA and Mr. and Mrs. Melvin Cruzen, president of ECSA and Lightweight Aggregate Corp., enjoy the evening's festivities which include a "Pennsylvania Dutch Night."

ing Materials activities, based on the recent meetings in Atlantic City in June of Committee C-9, which deals with specifications of lightweight aggregates and early concrete, and C-15, which covers masonry units. He also gave a preliminary report on the progress to date of an association-sponsored research program being conducted in a laboratory to determine unit weights.

Architects are not able to tie down unit weights of lightweight concrete in service, he pointed out. Producers can give plastic weights and oven dry weights; to emphasize the range involved in this category, he noted that the plastic weight of a typical clay and shale aggregate was 117.5 lbs. per cu. ft., while the oven dry weight was 100.7 lbs. per cu. ft. Using two-cylinder specimens, he said that oven drying for 72 hours in a ventilated oven showed a variance in humidity of from 22% to 60%. In each case on submerging, the unit weight increased over plastic weight.

Determine Weights

Pfeiffenberger said it is increasingly common to determine weights in 11 to 16 days instead of waiting for 28 days, as formerly. This is done by accelerating drying under controlled conditions. The ASTM meetings in Atlantic City recommended intensified attention for uniform laboratory practices; some labs have poor air circulation which gives a false relative humidity indication. "There must be strictly 50% relative humidity and 73.4-degree temperatures maintained at all times for accurate results," the ECSA consultant emphasized. He observed that the committee on lightweight aggregates has been broken into three units: Insulating aggregates, test methods for lightweight concretes and specifications for aggregates and structural concrete.

The third and final speaker for the opening sessions Thursday was Ernest Gruenwald, technical services manager for Lone Star Cement Corp., New York City. "Recent years have seen a tremendous growth of interest in lightweight structural concrete, so that today there are not sufficient quantities of structural lightweight aggregates available to fill the demand," Mr. Gruenwald said. "The importance of lightweight aggregates for structural concrete has found recognition by the establishment of ASTM specifications (C330 and 60T) and by American Concrete Institute in their 'Recommended Practice for Selecting Proportions for Structural Lightweight Concrete.' (ACI 613A-59). Structural lightweight concrete must of necessity be a high quality concrete and can be obtained by following the well-established principles of concrete technology."

Four Problems Involved

Mr. Gruenwald said four problems may be involved in the design of lightweight concrete mixture: (1) What mix is necessary to produce concrete of proper strength for given work? (2) With given materials, what proportions will give the best concrete at minimum cost? (3) With different lots of materials of different characteristics, which is best suited for the purpose? (4) What is the effect on strength of concrete from changes in mix, consistency, or size and grading of aggregates?

"The increased use of lightweight aggregates in structural concrete was paralleled by a large amount of research work carried out at various agencies such as the Bureau of Reclamation, the Portland Cement Association, various universities and in particular by the producers of lightweight aggregates. This research work has established certain funda-

(*Continued on page* 95)

Richard Miller, Lehigh Materials Co. (in shirtsleeves) explains the type of raw materials used in making lightweight aggregate at his company's plant. A coal-mine waste is expanded in the manufacture of "Lelite."

Shown with Ted Berger (left), secretary of the ECSA, are James Fauzio, President of the Greenwood Mining Co., which the group toured, and James Wynn, Aggregates Equipment Co.

Why you should always use **STOODY BUILD-UP** to support a **HARD-FACING OVERLAY**

Worn parts are sometimes rebuilt with mild steel followed with an overlay of hard-facing. This procedure is like trying to support a thin glass plate on a sponge. *Poor compressive strength in the supporting base causes cracking and spalling of the surface alloy.* To insure a proper base use STOODY BUILD-UP... *it does a job mild steel can't approach!*

SEEING IS BELIEVING—Here are three $\frac{3}{4}$" diameter test pieces of different analyses, each submitted to the same 200,000 lb. compressive load.

No. 1 E-6010 DEPOSIT—Under pressure it has mushroomed to almost half its original height.

No. 2 E-7010 DEPOSIT—Somewhat better than E-6010 but still inferior for the job.

No. 3 STOODY BUILD-UP DEPOSIT—Has still retained virtually all its original height; shows minimum deformation.

STOODY BUILD-UP CHARACTERISTICS

Besides high yield strength, STOODY BUILD-UP provides good ductility; RC hardness ranges from 21 to 34 (depending upon application procedure). Can be deposited in a higher useable current range; up to 275 amps with $\frac{5}{32}$" electrodes. Arc is smooth and stable. Smoke and spatter loss are minimum. Beads lay smoothly and high buildups can be made in a single pass. STOODY BUILD-UP offers the highest burn-off rate in the industry—61.8 ft. per hr. Deposits up to 6.30 lbs. per hr., higher with larger electrode diameters . . . results in less cost per applied pound. Deposits are machinable.

WHERE TO USE STOODY BUILD-UP

- As an underbase for hard-facing overlays
- For restoring size to any low alloy or carbon steel part
- As a final deposit to parts subject to high impact and compressive loads
- As a machinable deposit on steel shafts and slow turning gears

COST? Lowest in its field per pound of deposited metal—*by far the most efficient electrode for the job!*

SEE YOUR STOODY DEALER—He carries full stocks of STOODY BUILD-UP. Check the yellow pages of your phone book or write direct.

STOODY COMPANY

11950 E. Slauson Avenue • Whittier, California

Circle Service No. 40

Raw Materials . . .

(*Continued from page 75*)

most sections of the country, rocks of these two types are in almost unlimited supply. However, there are no currently known sources in the literature that will give approximate P.C.E.'s for different rock types. It can be generally stated, however, that the "low" P.C.E. materials are generally found in the basic rocks (excess of dark colored minerals) and the "high" P.C.E. materials are in the acidic ones (excess of light colored minerals). There are exceptions to this generality, e.g., the ultra basic rocks such as dunite, chromite, magnesite and talc, which are excessively refractory for structural clay firing schedules.

When discussing both acid and basic rocks, it is customary to think only of igneous rocks. Sedimentary and metamorphic rocks are not normally classified as basic or acidic; however, they might well be because a basic rock is defined as being substantially dark in color whereas an acidic rock is appreciably light colored in nature. Unweathered white to cream colored shales, sometimes abundant in association with coal measures, are refractory, whereas the dark colored shales are less refractory. Generally, dark colored minerals indicate the presence of fluxes, and the absence of dark colored minerals (white feldspars are an exception) indicates more refractory materials.

Usable Basic Rocks

For example, basic rocks (igneous or metamorphic) and sedimentary rocks that can be used as bonding materials are trap rock, gabbro, basalt, basic flows, hornblende gneiss, unweathered shale, syenite, diabase, etc. Normally, these rocks, if they are not extensively weathered will have P.C.E.'s in the neighborhood of 2 to 6. This range of cones is the same as that presently achieved during the firing schedule of most conventional structural clay ware. Most unweathered shales that are quarried commercially are in this pyrometric cone range. Therefore, it then can be summarized that the minor portion (bonding phase) of the ceramic block composition mix can be of a basic igneous rock,

Salting sewer pipe with borate and salt in beehive kiln.

Salters! get a better glaze...

add RASORITE® 46
sodium borate concentrates

...a thrifty form of borax for you!

When used for salt glazing, RASORITE 46 is a real performer! This low-cost borate ore concentrate equals higher priced borax and boric acid in its salt-glazing action. You get their benefits at a discount. So, add RASORITE 46 to your salting to improve the quality of your ware... to save on fuel costs... to get increased production with fewer rejects. Remember, a borate-salt mixture yields the best glazes for sewer pipe... and RASORITE 46 gives you the most B_2O_3 for your money!

Write for further information today!

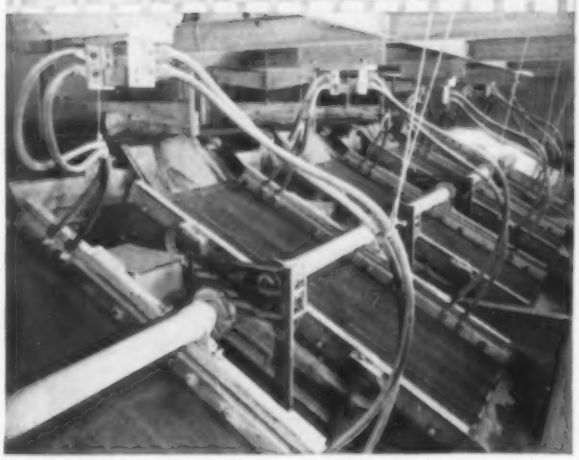
U.S. BORAX

630 Shatto Place, Los Angeles 5, California

Distributors Conveniently Located in All Principal Cities

Circle Service No. 41

this screen stays clean!



Each of these electrically heated "UP" vibrating screens is connected to a 12-kva transformer.

ELECTRICALLY HEATED CLOTH PREVENTS BLINDING OF LINK-BELT "UP" VIBRATING SCREENS

Link-Belt "UP" vibrating screens always work at *full capacity!* Even the "stickiest" jobs can't dampen their efficiency. Electrically heated screen cloth combines with high-speed elliptical vibrating action to maintain high-volume, precise, blind-free sizing.

"UP" screen cloths are heated by a "series" arrangement. Few cables are needed and initial cost is low. The "series" method (originated by Link-Belt) provides extremely uniform heating with a very low current consumption. Other "UP" economy features include overall rugged construction and two-bearing design simplicity.

Available in open and enclosed types, single or double decks, in a wide range of sizes. For full details, ask your nearest Link-Belt office for Book 2777.

LINK-BELT

15,606

VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World.

Circle Service No. 42

INTERNATIONAL

BUILDERS OF BETTER INDUSTRIAL CARS FOR INDUSTRY

KILN • TRANSFER • DRYER CARS

There is a reason why the ceramic industry shows an overwhelming preference for INTERNATIONAL cars. They are engineered and designed with full knowledge of the heavy loads, severe operating conditions and unusual performance that will be required of them.

Whether the need is for KILN, DRYER or TRANSFER cars . . . be sure they carry the name INTERNATIONAL for maximum service with minimum maintenance.

Remember the name INTERNATIONAL . . . *the leader for over half a century.*

Informative literature and catalogs available upon request.

THE MOST RUGGED INDUSTRIAL CARS BUILT

INTERNATIONAL CLAY MACHINERY, INC.

1335 WEST 12th ST., ERIE, PENNSYLVANIA

Circle Service No. 43

metamorphic rock or unweathered sedimentary shale.

Basic rocks, regardless of their grain size, usually contain little or no SiO_2 as quartz of a particle size that could create firing problems. However, there are cetain basic rocks such as quartz diorites and others that do contain appreciable percentages of noncryptocrystalline grains of quartz. If the quartz grains can be seen with the eye or a 9x glass, it is wise to avoid the material because the quartz will usually increase the P.C.E., and more important, result in a "punky" fired body regardless of its P.C.E. This is the result of the polymorphic inversion of the large quartz grains. However, if the rock is substantially cryptocrystalline in texture, then the quartz content is essentially of no concern ceramically.

Cryptocrystalline indicates that the individual grains of the rock cannot be normally distinguished macroscopically. A rock, either basic or acidic, that is cryptocrystalline, has a groundmass that is by definition aphanitic. In contrast, a granite has a groundmass in which the individual minerals can be detected macroscopically and is therefore granatoid or phaneritic. This texture is in contrast to the cryptocrystalline rocks which have an aphanitic texture.

Use of Acidic Rocks

The rock types that can be used as the more refractory phase materials, the major portion of the ceramic block composition, are the acidic rocks which may possess an aphanitic or glassy texture. These rocks usually have P.C.E.'s in the range of 9 to 14. Specific rocks of this type are rhyolites, acid tuffs, arkoses, volcanic breccias, trachyte, obsidian, etc. As mentioned previously, light colored unweathered shales could be used as the more refractory phase.

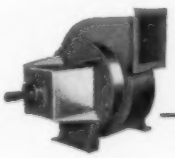
Generally speaking, the lighter in color a rock is, the higher the P.C.E. Light colored feldspars are an exception. It is therefore a matter of searching the local commercial quarries that have "screenings" for sale; from a sample of the available material, the P.C.E. can be easily determined. If there are no local sources of rock materials for the more refractory or bonding

Of course, not every industrial process requires fans that will operate in temperatures up to 2000° F. But when they do . . .

. . . *no job is too hot to handle for a Thermal-Aire Fan!* High temperatures, corrosive atmospheres, dust-laden or gaseous environments . . . whatever the condition, you can rely on Thermal-Aire Fans for smooth, dependable performance because . . .

. . . *every Thermal-Aire component is designed for the job!* A good example is Garden City's exclusive Air-Cooled Shaft. Without water cooling, heat slingers or other cooling systems, this unit disperses heat quickly, efficiently. Keeps bearings cool. Prolongs fan life. The Air-Cooled Shaft is typical of the engineering skill and manufacturing quality built into Garden City Fans for more than 80 years.

For a smooth operator on *your* hot jobs, be sure you specify Thermal-Aire Fans! Write today for Bulletin 960. *Garden City Fan & Blower Co., 807 North Eighth Street, Niles, Michigan.*



Thermal-aire Fans®

Circle Service No. 44

JIFFY-LIFT CAN TRIPLE YOUR DELIVERIES DURING PEAK PERIODS!

Users all over the country report that Jiffy-Lifts earn their own way—and then some.

Jiffy-Lift's efficient engineering and ease of operation insure years of economical, trouble-free service, and make the loading and unloading job as rapid and as easy as possible. You can actually cut your delivery time to one-third over outdated methods. Easily installed and maintained, the Jiffy-Lift is your answer to loading and unloading problems.

- Four Wheel Drive . . . reduces slippage, safer to load and unload on an incline, fast, smooth operation.
- Automatic Trip Release . . . raises cradle while driver readies next cube, automatically stops.
- Four Cable Suspension . . . eliminates swinging, permits lifting 10,000 pound loads with ease.
- Dual Controls . . . may be operated from either side of truck.

JIFFY LIFT

For Complete Information, Write, Wire, or Phone today!

ELBERFELD Manufacturing Co., Inc.
Elberfeld, Indiana, U. S. A. • Telephone 131

Circle Service No. 45

Chase Kiln Car loaded with glazed tile and ornamental screen tile at The Claycraft Company's Columbus, Ohio plant. Total load on car, including fire brick, is approximately 12,000 pounds.

CHECK THESE FEATURES:

- Wheels made in our own foundry, with a deep, uniform chill (400-450 Brinell)
- Treads ground to accurate concentricity
- Car frames assembled in jigs and welded in our own shop under close supervision
- Cars made to accommodate any type of refractory top
- Precision-type bearings of your choice — specify roller, ball or Timken
- Final assembly checked for perfect alignment before cars leave our plant

Stack 'em HIGH, W-I-D-E and *SAFELY* on CHASE KILN CARS

Back-up tile or ornamental shapes . . . they're all safely handled on smooth-rolling Chase Tunnel Kiln Cars. Precision-built to give years and years of satisfactory service, with trouble-free running gear designed not to wobble or sway.

Send your drawings or specifications for a prompt estimate, or ask our Engineering Department to adapt a standard car to your particular needs. Chase Kiln Cars can be built to fit any size, type or make of kiln.

WRITE FOR CATALOG

Chase FOUNDRY & MANUFACTURING CO.
2350 Parsons Avenue • Columbus 7, Ohio

Circle Service No. 46

phase, then the only step one can take is to prospect for the desired rock type. This is not such a large task as it might seem to be because rocks possessing the desired physical and pyrochemical properties are not rare ones at all. Hence, the state level geological survey can normally indicate geographic areas where rocks of this type can more than likely be found. Even if a ceramic manufacturer has to obtain a part or all of the raw materials either by contract quarrying or by buying machinery to set up a portable quarry, the use of rock that has the proper P.C.E. is far cheaper than the use of prepared aggregate of the same P.C.E. requirement.

Mode of Operation

General Mode of Operation. The bonding and more refractory phases of the composition, whether they be all lightweight, all heavyweight, or a combination of heavy and lightweight aggregates, are reduced to essentially —8 Tyler Standard Mesh in particle size. The sieve analysis shown in Table I is a typical particle size distribution which has been found to be optimum in the manufacturing of concrete block size ceramic building units.

Table I—Typical Sieve Analysis of Aggregates Used in Ceramic Block Compositions

Tyler Standard Mesh	Percent Retained
8	1.75
10	17.00
14	27.59
20	16.94
35	15.66
48	1.86
Pan	19.20

The two phases of the composition (bonding and more refractory phase), properly proportioned, are thoroughly dry mixed and then tempered with water in which there has been dispersed or dissolved, as the case may be, a substance that will impart adequate dry strength to the ware upon drying of the green body. The amount of water will vary slightly, but in general it will normally be 10% of the gross weight of the composition. In most cases, this 10% water content can be approximately 1/9 by volume, the bonding phase 3/9 by volume, the more refractory phase 5/9 by volume. Any commercially available

ROBBY SAYS:

Look to ROBINSON for Smooth Handling of Air

IN KILNS—DRYERS—SINTERING BELTS

Robinson air handling equipment for the ceramic industry is custom-engineered to meet the specific requirements designed into your tunnel kilns, periodic kilns, sintering belts, or product dryers. Long experience in improving air handling techniques gives Robinson engineers quick understanding of your problem, plus the know-how for solving it. Every Robinson solution has 3 ingredients: (1) efficient air handling, (2) low power consumption, and (3) extended mechanical life.

Type J Fan
600 to 450,000 cfm
Bulletin 2500

Type AE Exhauster
400 to 90,000 cfm
Bulletin 5100

Sulky Type
Man Cooling Fan
Bulletin 8001

Type CS
Pressure Blower
Bulletin 1100

SUSTAINING ASSOCIATE SCPI

Why not take a tip from Robby—look to Robinson for smooth handling of air—the result of expert engineering cooperation. Write today.

Member of AMCA

INDUSTRIAL FANS • BLOWERS • EXHAUSTERS

ROBINSON VENTILATING CO.

119 HENDERSON STREET, ZELIENOPLE, PA.

Circle Service No. 47

dry strength binder material that is added to the composition to impart dry strength to the dried ware, should be not less than 1/4% by weight of the gross composition (aggregate, water and binder material).

Most of the many dry strength binder materials on the market are satisfactory; however, one well known additive that is a liquid has been proven both in the laboratory and actual plant production to be a dry strength binder of superior properties. It is immediately and infinitely missible in cold water; these two properties are almost mandatory for use with mass production techniques. Even though this additive is a liquid, it will not freeze in ordinary winter weather, and it can be pumped in the proper proportion into the water lines that feed the tempering water to the aggregate mixture. If this binder material is simultaneously pumped with the tempering water into the dry aggregate mixture, an optimum distribution of the dry strength binder material throughout the aggregate mixture can be achieved. This procedure makes possible adequate dry strength in the dry ware from a minimum amount of dry strength binder material.

The wet mixture is then formed into the desired ware by means of conventional or slightly modified concrete block machinery. The green ware is then dried to 1% moisture content or less and subsequently hacked on the kiln cars. The firing schedule of the ware, a function of the binder phase aggregate materials, has been discussed previously. However, it can be emphasized by restating that the firing schedule is to be so designed from a time and temperature point of view so that the P.C.E. of the ware bonding phase is approximately the cone acheived in the kiln during firing. Normally, if these simple manufacturing procedures are followed, the resulting ware will exceed all of the specifications that are described in the A.S.T.M. Designation C 90-59 for concrete block as determined by the A.S.T.M. Designation C 140-39.

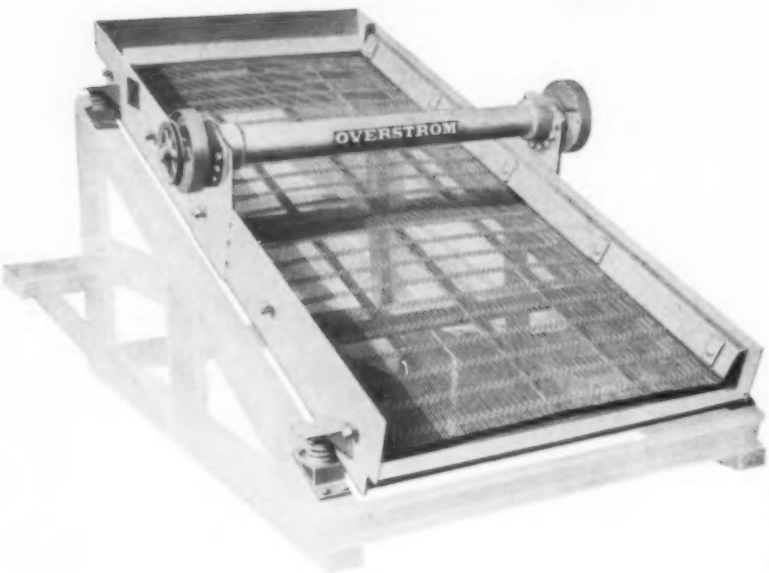
Properties and Costs

Physical Properties and Raw Material Costs of Various Ceramic Blocks. At this point of the discussion, all of the manufacturing fundamentals of concrete block size ceramic building units have been described, and it is now time to bring into focus the raw material cost and physical properties of ceramic block made from various combinations of heavy and lightweight aggregate raw materials. Table II (page 67) tabulates the raw material cost per block, weight of the various three core 5.33" x 8" x 16" ceramic units, percent shrinkage, gross compressive strength and percent absorption.

All of the ceramic units listed were made from compositions that contained by volume 3/9 binder phase materials, 5/9 refractory phase materials and 1/9 water. As previously specified, the amount of dry strength binder material was no less than 1/4% by weight of the gross materials used. The block were fired to the pyrometric cone equivalent (P.C.E.) of the binder phase in eight hours. All of the aggregate was reduced in particle size distribution to the typical sieve analysis as shown in Table I.

The lightweight refractory phase

something really *New*...



Overstrom's *Series 500* vibrating screen

Overstrom introduces another winner in a long line of screening champs!.... *the new Series 500!*

Ideally suited for certain lighter-duty screening requirements, the *Series 500* is built with the same exacting standards as its "big brother" (Series 1000). All the famous Overstrom operating characteristics and construction features are there!

Here's your chance to stay a step ahead. Check out the *Series 500,* now!

★ *New literature immediately available. Ask for Bulletin No. 511.*

OVERSTROM VIBRATING SCREENS

OVERSTROM & SONS, INC. • Dallas, Texas • Alhambra, California • USA
address inquiries to: 1031 South Haskell Avenue, Dallas 23, Texas
Circle Service No. 48

• Automatic Hacking

ANOTHER FIRST FOR C.E.S.

• Again plant operation experience and sound engineering produces higher quality at lower cost. Contact us for information on an automatic hacking system to suit your plant facilities.

• We design and supervise installation of the Carpenter Engineering Recirculation System for tunnel kilns and dryers.

Quality production improvement up to 100% at a fraction of the cost of a new kiln.

Pay for your installation from operating economies.

• C.E.S. Tunnel Stage Dryers are designed and built for full circulation, recirculation, and temperature and humidity control.

• C.E.S. Dryers can be adjusted to provide the most favorable drying conditions for a full range of materials (from the most sensitive tight-bodied clays and kaolins to fast drying, easily slumped shales.

• Exclusive Manufacturers of the Dutch Colonial Roll for a natural duplication of water struck markings on face brick.

Other unusual textures available.

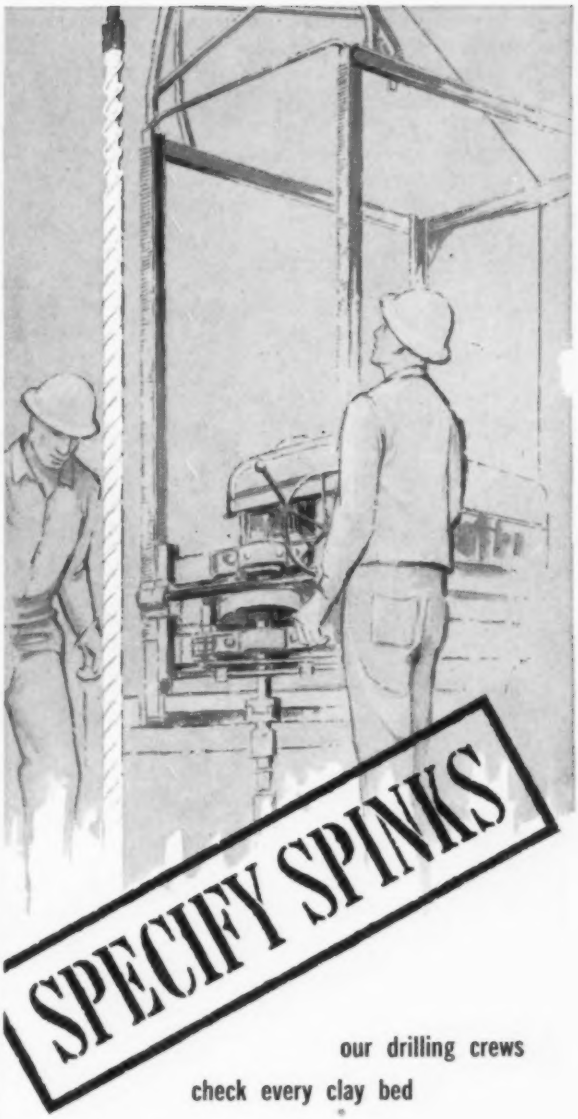
CARPENTER

ENGINEERING SERVICES

PLEASANT ROAD

WAREHOUSE POINT, CONNECTICUT

Circle Service No. 36



SPECIFY SPINKS

our drilling crews check every clay bed

First step in determining quality and extent of our clay deposits is core sampling of the bed.

Our world's largest known reserves of ball clay are a guarantee of consistent high quality and dependable supplies.

The drilling crews are another important part of our team.

the quality brand

H. C. SPINKS CLAY CO., INC.

Box 829 • Paris, Tennessee • Box 151 • Ft. Thomas, Kentucky

Circle Service No. 37

aggregate used in compositions one and two was a sintered clay whereas in compositions three and four, the heavyweight refractory phase was rhyolite. Lightweight bonding phase aggregate, used in compositions one and three, was an expanded shale, and the heavyweight binder phase aggregate, compositions two and four, was trap rock. Normally, it is rare to find commercially available an expanded shale of the proper P.C.E. that would be appropriate for the refractory phase of a ceramic block formulation. Inasmuch as glass formation, as well as simultaneous evolution of gases, is mandatory in the manufacture of an expanded shale, it is current commercial economic practice to fire the expansible shale particles around 2300°F.

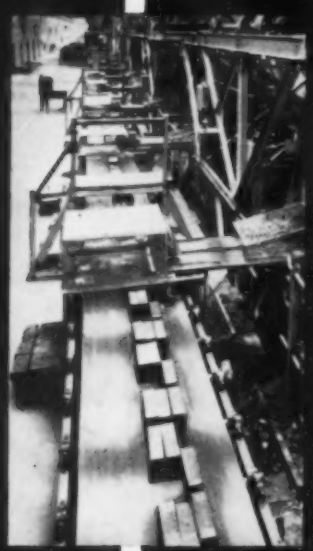
If an expansible shale were available in sufficient tonnage for lightweight aggregate production but required that 2600°F or higher be used to form the necessary glassy phase, the economics would be prohibitive. However, in unusual circumstances, a lightweight expanded refractory phase aggregate may be available as the result of an expansible shale, substantially comprised of fire clay particles, expanding during the combustion of the organic matter in abandoned coal mine refuse dumps. Sintered clays are by far the most abundant commercial source of aggregate material suitable for the refractory phase component. However, not all sintered clays are in the 12 to 15 P.C.E. range. Some have a P.C.E. of seven or lower and consequently could be used in normal practice as the binder phase aggregate only.

Why SANDVIK
STEEL BELT CONVEYORS
Stay Trouble-Free
For Decades

In brick and clay plants throughout the world, there are Sandvik conveyors that have been giving successful service for twenty years and more.

Biggest factor in these service records is the inherent stamina of Sandvik's solid, cold-rolled steel belt. It can take *oil, heat, moisture, friction, impact* and *heavy loads* and keep on running smoothly year after year.

Sandvik supplies complete conveyors, steel belts and pre-engineered conveyor components. Write for further information.



SANDVIK
STEEL, INC.
Steel Belt Conveyor Department
1702 Nevins Road • Fair Lawn, N. J.
Cleveland • Detroit • Chicago • Los Angeles

SANDVIK
STEEL
BELT
CONVEYORS

SS-211

Circle Service No. 49

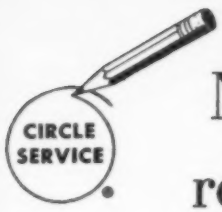
3-Core and 2-Core

The ware formed from compositions one, two, three and four, (Tables II and III) were 3-core ceramic blocks, the outside dimensions of which were nominally 5.33″x8″x 16″. From a study of Tables II and III, it can be seen that as the weight of the ware increases, the raw material cost per unit is correspondingly reduced. Composition number four, the all-heavyweight aggregate body, has a raw material cost of approximately 40% of that of the all-lightweight body (composition number 1). This composition is an all-rock body and consequently the cheapest but results in the heaviest of the blocks that are listed.

However, if the basic block geometry were to be modified to a 2-core instead of a 3-core configuration, then it would be anticipated that the weight would be appreciably reduced. It has been postulated by experienced plant operators and brick salesmen that a 5.33″x8″x16″ ceramic block that weighs approximately 20 pounds per unit would suffer no weight disadvantage with the lightweight concrete block competition.

General Comments. Commercial concrete block machinery that is now being manufactured can form a ceramic block that is surprisingly dense when compared to blocks formed from the same composition on machines previously manufactured. This "high" density is achieved without any detrimental effects overly evident in the final texture of the ware surface. The relatively high green body density prevents the ware from sticking together in the stand during the firing schedule and great-

(*Continued on page* 87)



Now you can receive FREE information on:

- Advertised Goods
- New Products
- New Literature

HOW TO USE:

Simply circle the number corresponding to the advertisement or product number on the card. Mail the card and we will do the rest. You may circle as many numbers on one card as you wish.

Use this valuable service to obtain complete information about the many products available to you. Send us one card now and save the second card for later use.

Brick & Clay Record
P.O. Box 3382
Merchandise Mart Sta.
Chicago 54, Illinois

1	16	31	46	61	76	91	106	121	136	151	166	181	196	211
2	17	32	47	62	77	92	107	122	137	152	167	182	197	212
3	18	33	48	63	78	93	108	123	138	153	168	183	198	213
4	19	34	49	64	79	94	109	124	139	154	169	184	199	214
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ___ STATE _____

B&CR-9-61 This card void after November 28, 1961

First Class
Permit No. 183
Chicago, Ill.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY-

Brick & Clay Record
P.O. Box 3382
Merchandise Mart Sta.
Chicago 54, Illinois

First Class
Permit No. 183
Chicago, Ill.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed In the United States

POSTAGE WILL BE PAID BY-

Brick & Clay Record
P.O. Box 3382
Merchandise Mart Sta.
Chicago 54, Illinois

1	16	31	46	61	76	91	106	121	136	151	166	181	196	211
2	17	32	47	62	77	92	107	122	137	152	167	182	197	212
3	18	33	48	63	78	93	108	123	138	153	168	183	198	213
4	19	34	49	64	79	94	109	124	139	154	169	184	199	214
5	20	35	50	65	80	95	110	125	140	155	170	185	200	215
6	21	36	51	66	81	96	111	126	141	156	171	186	201	216
7	22	37	52	67	82	97	112	127	142	157	172	187	202	217
8	23	38	53	68	83	98	113	128	143	158	173	188	203	218
9	24	39	54	69	84	99	114	129	144	159	174	189	204	219
10	25	40	55	70	85	100	115	130	145	160	175	190	205	220
11	26	41	56	71	86	101	116	131	146	161	176	191	206	221
12	27	42	57	72	87	102	117	132	147	162	177	192	207	222
13	28	43	58	73	88	103	118	133	148	163	178	193	208	223
14	29	44	59	74	89	104	119	134	149	164	179	194	209	224
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225

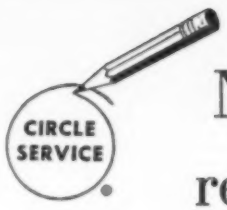
NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ___ STATE _____

BBCR-9-61 This card void after November 28, 1961



Now you can receive FREE information on:

- Advertised Goods
- New Products
- New Literature

HOW TO USE:

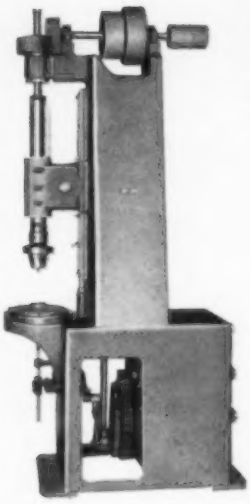
Simply circle the number corresponding to the advertisement or product number on the card. Mail the card and we will do the rest. You may circle as many numbers on one card as you wish.

Use this valuable service to obtain complete information about the many products available to you. Send us one card now and save the second card for later use.

Brick & Clay Record
P.O. Box 3382
Merchandise Mart Sta.
Chicago 54, Illinois

FROM COAST to COAST

B A I R D



FOR CLAY MOULDING

FLOWER POTS
FERTO POTS
FERN POTS
PEAT POTS
SAUCERS
STOPPERS
CRUCIBLES

BUILT IN 4 SIZES FOR WARE UP TO 12" DIA.

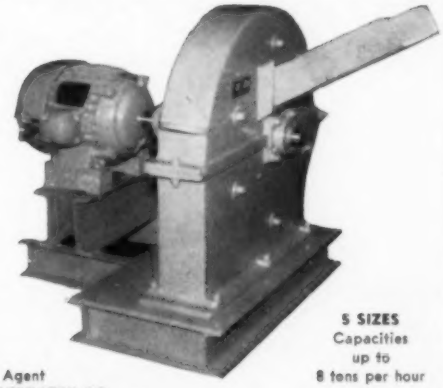
M E A D

SINCE 1887

FOR PULVERIZING

DRY GRINDABLE SOLIDS

Proven • Efficient • Durable



5 SIZES
Capacities up to 8 tons per hour

Pacific Agent
FERNHOLTZ MACHINERY CO.
8468 Melrose Place
Los Angeles 46, California

Five pound samples ground to your specifications at no charge.

SIMMONS BOILER & MACHINE CO., INC.

9011 CENTRAL • DETROIT 4, MICH.

Circle Service No. 50

DON'T ROB PAYLOAD WITH UNNEEDED CRANE WEIGHT!

TEALE "200" GIVES TOP PERFORMANCE BUT WEIGHS LESS, TAKES LESS SPACE!

PROFIT . . . SATISFIED CUSTOMERS in the competitive brick business . . . the BEST reason to buy a fully-hydraulic, truck-mounted **TEALE "200" CRANE!** Delivering packaged brick with a tough "200" you have far less handling (MORE PROFIT) . . . less loss from chippage and broken brick (MORE PROFIT) . . . faster service (MORE PROFIT)! A **"200"** will load the truck . . . then unload it (500 per package) in 10 to 15 minutes, anywhere on the job site. Some on 2nd or 3rd story scaffolds! Others on the ground, at convenient points (or well below ground level if required)! That means one man can deliver 40,000 brick per day with an average truck.

The **"200"** provides more lift . . . WEIGHS LESS . . . takes less space! Weighs just 2500 lbs. with pallet fork! MOUNTS in 17 inches of space . . . on any truck with curb weight of 5,500 lbs. and up! LIFTS 3,750 lbs. at 8', 2,500 lbs. at 16'. It works in full 360° circle, with HYDRAULICALLY EXTENSIBLE OUTRIGGERS TO STABILIZE LOAD! Smooth hydraulic action is controlled by solenoid-valve system that permits remote operation, or hand control with "feathering."

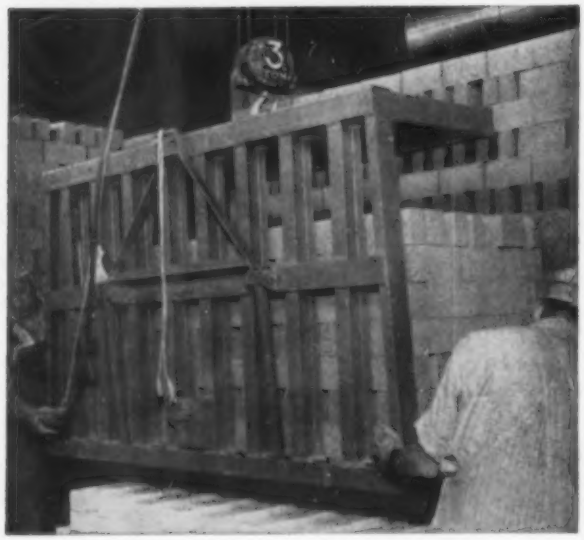
For more information about the BEST hydraulic crane for YOUR BUSINESS . . . WRITE

Teale & co.

Box 605 Downtown Station Omaha 1 Nebraska

Circle Service No. 51

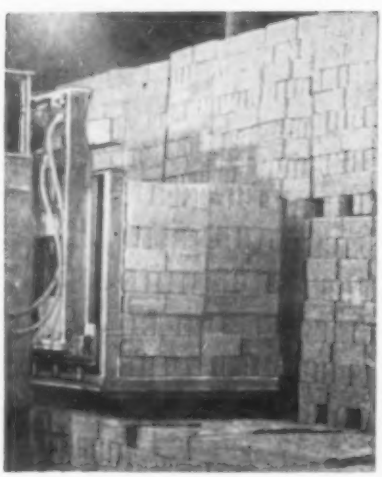
Make Brick Handling Easy...



PRIESTER Brick Forks

- Save Time
- Save Money
- Save Labor

Also Priester truck cranes for unloading from delivery trucks. Write for bulletin.



Brick in units of any size are handled by Priester Brick Forks. Automatic operation simplifies and speeds brick handling, setting and drawing kilns, loading and unloading trucks and box cars.

Forks with flap grippers for cored and solid brick. Give service . . . take the hard work out of brick handling. Write today for more information.

BRADNEY MACHINE CO., INC.

Middletown, New York

Circle Service No. 52

"Ceramic"

GIVES YOU

DEPENDABLE QUALITY

and

RELIABLE SERVICE

on

COLORS and CHEMICALS for BRICK and TILE

GLAZE STAINS
ENGOBE STAINS
IRON OXIDE GRANULES
NICKEL OXIDE GRANULES
MANGANESE OXIDE GRANULES
COLORED GRANULES
ALBANY SLIP
ALUMINUM HYDRATE
ALUMINUM OXIDE
BARIUM CARBONATE
CALCIUM CARBONATE
COBALT OXIDE
COBALT SULPHATE
COPPER OXIDE, BLACK
DOLOMITE
FLUORSPAR
GREEN CHROMIUM OXIDE
GUMS
IRON CHROMITE
LEAD BISILICATE
OPAX and SUPERPAX
RED IRON OXIDE
RUTILE
WHITING
ZIRCONIUM SILICATE
ZINC OXIDE

This is a partial list of materials available. Write or call about any color or chemical you use in your production.

C-48

CERAMIC COLOR and CHEMICAL MFG. CO.

NEW BRIGHTON, PA., U. S. A.

Phone TIlden 6-4000

Circle Service No. 53

(*Continued from page* 82)

ly improves the fired compressive strength. However, it has no currently proven effect on the absorption of the fired body. Other things being equal, the degree of mixing both in the dry and wet state appears to influence the absorption as well as the compressive strength in a given composition. In general, the higher the degree of intermixture of the particles in a given composition, the better the physical properties even if the green ware density is comparatively low. Strange as this may sound, this fact has been proven many times both in laboratory and pilot plant trials.

The absorption of a ceramic block is considered by many plant operators to be of major concern. All of the data to date indicate that the fired ware absorption (24-hour cold water soak) is a function of the amount of bonding phase aggregate, firing schedule and the effectiveness of the apparatus used in the mixing of the aggregates, water and dry strength binder. Generally speaking, the ribbon-type mixer which is normally sold with concrete block forming machinery is not as effective per unit mixing time as a muller-type mixer of the same capacity.

At this writing, ceramic block compositions that were mixed with a ribbon-type mixer and subsequently formed into ware and fired, resulted in a fired body that possessed lower compressive strengths and higher absorptions than did ware formed from the same compositions but mixed with a muller-type mixer and fired on the same schedule. No detrimental "grinding" of the aggregate particles, as a result of the inherent muller action, was observed in ware formed from muller-type action mixed compositions when compared to block formed from compositions that were mixed in a ribbon-type mixer.

Summation

Summation. In conclusion, the manufacture of a successful and low cost ceramic building unit, either heavy or lightweight, that may have the same or similar geometry and texture as that of the concrete block competition can be accomplished. In addition, a ceramic unit of this size will have physical properties superior to that of the concrete block competition simply because of the inherent continued hydration of the portland cement used as the bonding agent in concrete block.

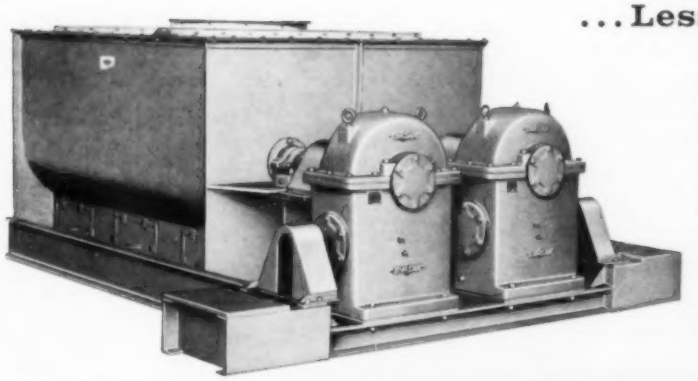
All of the ceramic blocks tabulated in Table II were formed from compositions so pyrochemically designed that there was insignificant shrinkage and no deformation as a result of load in a stand of block no more than 40 inches high during firing. This height is optimum for most tunnel kilns that are designed for firing brick. Consequently, all that is needed for a brick plant operator to get into production of concrete block size ceramic building units is forming machinery, the proper raw materials, a dryer and plenty of effort. The last item, from all observations, is the most expensive!

Acknowledgement. This work was supported in part by the Statesville Brick Company, Statesville, N. C. The author is grateful to Mr. E. R. Rankin, president and Mr. J. E. Rankin, vice-president of this firm, for their help, guidance and for the permission to publish this work.

EHRSAM®

DOUBLE-BARREL MIXER

Increases Productivity ...Lessens Costly Downtime



The Ehrsam double-barrel paddle mixer writes its own ticket for economy and increased productivity as a fast, heavy-duty machine for the intensive blending of dry, powdered or granular materials.

Precision engineering and construction cut costly, annoying downtime. Steel plate mixing barrels, adjustable stuffing box seals, heavy-duty roller bearing pillow blocks are only a few of the stress points designed to withstand abusive, day-after-day operation.

Combined with a surge hopper, charging hopper with scales, Ehrsam will program an automatic charging, mixing, and discharge operation to your specifications.

20 TO 120 CUBIC-FOOT MODELS AVAILABLE

The J. B. EHRSAM & SONS MFG. COMPANY

Enterprise, Kansas

DISTRICT OFFICES

Kansas City, Kans. / Denver, Colo. / Chicago, Ill. / San Francisco, Calif. Fort Worth Tex. / Phoenix, Ariz. / Hastings, Neb. / Albuquerque, N. M.

EHRSAM Enterprise, Kansas

Please send new Ehrsam Mixer Catalog 8A. I am also interested in surge hoppers___; screw conveyors___; Dracon___; belt conveyors___; and bucket elevators___.

NAME_____

FIRM_____

ADDRESS_____

TOWN_____ STATE_____

E-M/2-661

Circle Service No. 54

Fast Firing . . .

(*Continued from page* 71)

the most useful oxygen analyzer.

The programmed temperature control is doubly important to the firing rate when one stack also serves other kilns. This is because the stack draft available to the kiln just being lit off would be more than with a cold stack. The amount of combustion air that could be put into the kiln would be greater, thus allowing more fuel to enter the kiln. This is fine as long as the known temperature rise is not exceeded. The only way to be sure is to program the temperature automatically. It would then set the damper position to follow the time-temperature profile desired.

In a periodic kiln that has combustion air blowers as Figure 3, a change in draft does not have a wide effect on fuel-air ratio. A change in draft changes excess air by allowing more (or less) infiltrated air to enter the kiln for more (or less) draft. Thus we should keep it at a constant minimum amount by a separate draft control.

If stack draft available at light off is the limiting factor then the kiln draft should be controlled from combustion air. If we did it in the seemingly more direct fashion to control kiln draft from the stack damper we could pressurize the kiln through the functioning of the automatic control. This would be done since the temperature would have to control the combustion air and the oxygen would control the fuel input. Therefore, the temperature programming could open the combustion air wide to satisfy temperature requirements; however, if the draft was too small to handle all the combustion air from the blower the kiln would be pressurized. The oxygen analyzer would still maintain the fuel at its correct point but this would be an unsafe operating condition due to the pressurization.

Conversely by using combustion air to control draft, the most serious thing that will happen will be a more negative draft in the kiln than desired when there is more draft available than there is combustion air to utilize it. Thus, no operator hazards occur from puffs through inspection peep holes.

When flashing ware in the kiln, the use of the combustibles record is very important in that the fuel can be adjusted directly from combustibles during the flashing period to maintain a constant combustibles level. With a constant combustibles level maintained it merely would be a function of time to obtain a particular color. Reproducing specific colors would be possible with this measurement. It has been demonstrated on many processes where we have pioneered gas analysis that the combustibles record is a must.

For instance, in the making of steel in an open hearth a simplified explanation of the process is that the carbon in the iron must be oxidized to carbon monoxide to reduce the carbon content of the iron, thus making it steel. This carbon monoxide is then burned above the bath with combustion air to add heat to the process much the same as you burn the impurities in your ware and add heat to the process. The criterion of this process then is that we must have an oxidizing atmosphere at all times above the bath if we are to make it proceed as fast as possible. An increased amount of oxygen whether it be 5% or 18% does

- **Fluorspar**
- **Magnetite**
- **Chromite**
- **Manganese**

NATIONAL "ALWAYS UNIFORM" ESTABLISHED 1904

NATIONAL PAINT & MANGANESE COMPANY offers the following advantages:

1) Two producing plants strategically located at Brownsville, Texas and Lynchburg, Va. Complete inventories are constantly maintained at plants and Lindale, Texas warehouse.
2) Technical representatives backed by modern research facilities coupled with 66 years of experience present a backlog of unparalled information that is available to the brick producing industry.
3) Comprehensive quality control beginning with ore source and continuing throughout processing has been established to assure uniform product to customer's specification.

Serving the building brick industry is our business—not a sideline.

NATIONAL PAINT & MANGANESE COMPANY

A division of Howe Sound Co., Inc.

810 Park Building
Pittsburgh 22, Pa.

Plants:
Brownsville, Tex.
Lynchburg, Va.
Warehouse:
Lindale, Tex.

CONTRIBUTING ASSOCIATE SCPI

Circle Service No. 55

NOW . . . you need only one Barium Carbonate for:

DRY FEEDING • WET FEEDING • GLAZES

High purity . . . free flowing

Columbia-Southern NEW CERAMIX BT

IDEAL FOR MECHANICAL FEEDING—Uniformity and easy flow of New CERAMIX BT Barium Carbonate permits you to get a constant rate of barium addition without frequent adjustments in feeder settings.

PROVED IN THE FIELD—New CERAMIX BT Barium Carbonate has been in commercial production use in brick and clay product plants for several months now. All users are enthusiastic about its performance with all types of clays and shales, running in a wide variety of feeding equipment. Regular truckload and carload shipments of this improved Barium Carbonate are now being made. Best of all, high-purity, free-flowing New CERAMIX BT comes to you at *no premium in price.*

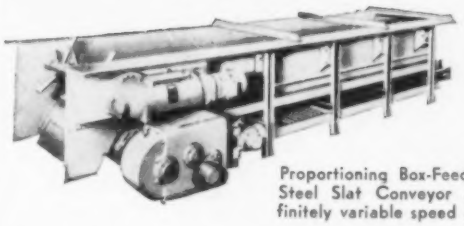
Next time you order Barium Carbonate for use in eliminating dry house scum in burned clay products, specify New CERAMIX BT from PPG Chemical Division. Give your operation 98-99% purity in the easiest handling form. Product information and samples of New CERAMIX BT are available from our district office nearest you.

columbia | southern chemicals
CHEMICAL DIVISION
PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA
DISTRICT OFFICES: Boston · Charlotte · Chicago · Cincinnati · Cleveland Dallas · Houston · Minneapolis · New Orleans · New York · Philadelphia Pittsburgh · San Francisco · St. Louis · IN CANADA: Standard Chemical Limited

Circle Service No. 56

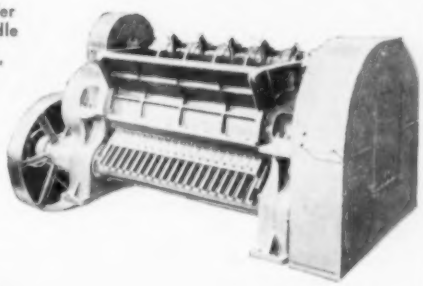
Händle
MÜHLACKER

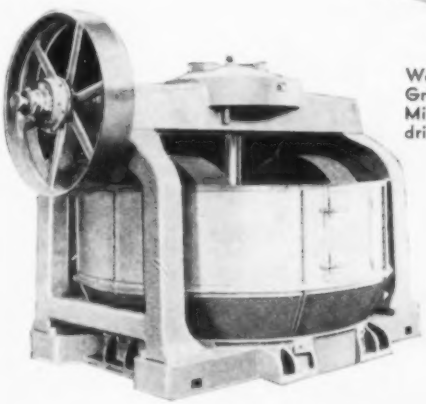
Clay-Working Machinery for Wet Preparation



Proportioning Box-Feeder with Steel Slat Conveyor and infinitely variable speed gear

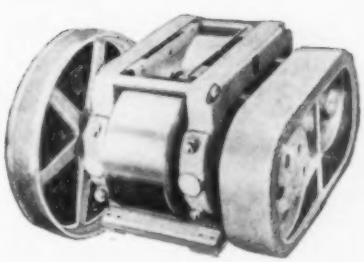
Crushing Roller with top paddle shaft for pre-crushing to 1" and down





Wet Mix and Grinding Pan Mill, overhead driven

Smooth Roller Mill, common or individual drive of both rollers, adjustment of roller clearance up to 1/250"



AGENCIES: **EASTERN CANADA:**
DOMINION BRICK & TILE MACHINERY
55 Front Street East, Toronto 1, Ontario
Phone EM 4-6857
WESTERN CANADA:
GORMAN'S LIMITED, Head Office 10238 - 104 Street, P.O. Box 369, Edmonton, Alberta

Karl Händle & Söhne, Muhlacker, Germany
Ceramic Machinery — Conveying Equipment

Circle Service No. 57

not speed up the process, therefore, the optimum point of operating the process is maintaining the oxygen as low as possible without showing any combustibles leaving the open hearth since this is a direct fuel loss.

In frit smelting there must be an oxidizing atmosphere above the surface of the frit in order to keep a constant color. Again, it does not matter whether we have 5% or 10% oxygen, the limit is that we have no combustibles. If we can hold ½% oxygen with no combustibles, fuel is saved. Having applied oxygen and combustibles analysis to these various processes we found the first inclination of most parties involved was to say "fine, we will cut the oxygen back but we will not cut it back to less than 2%" (particularly when they found their past normal operating point was 5 to 10% O_2). It took time to show them that this could be done and done safely from a product viewpoint. They are now realizing very substantial fuel and processing time savings because of this. Had they not had the combustibles record available to use in conjunction with the oxygen, they never could have achieved the optimum fuel saving in this type of operation.

In a periodic kiln where we start with a cold kiln, the combustible record is an aid in determining a loss of ignition at the burner. Here again we have a saving in time since the sooner the burner is relit the quicker our kiln comes up to temperature.

Conclusion

All of the above measurements and controls are standard on other processes, therefore, no new instrument developments are necessary for you to apply such equipment. The economics vary with the expected savings in time and fuel but they can be figured out fairly close in dollars and cents. The oxygen and combustibles measurement can be used as an operating guide to prove the benefits. The control can be plugged in later. These instruments can also be shared with other kilns to reduce total investment.

Where the product size and shape vary or when firing new products, you can take much of the guess work out of the operator's hands. As the opening paragraph stated, "from an art to a science" is the most surefire way to reduce operating costs. The age of the kiln does not change the principles stated above so all share the same optimizing potential.

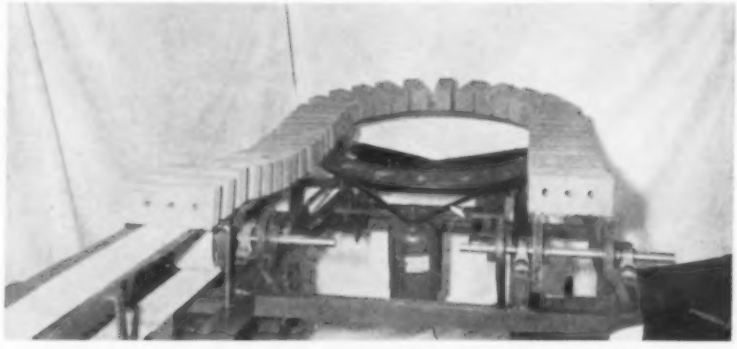
Figure 4 shows an example of fuel savings to be expected through reductions in excess air. This particular graph assumes that 2% oxygen is the optimum operating point of your hot zone of a tunnel kiln or during the soaking period in the periodic kiln. If you take an analysis in the ware chamber now and find it, say, 10% and your flue gases leaving the ware hot zone chamber on the way to the preheat zone are 1000°F you would be operating at approximately 18% loss in fuel over which you could be operating in this zone. Yes, you recover some of the heat in the preheat zone but a better zone control would be the result if the necessary fuel went in at the preheat zone. More turbulence is gained through burners than the gas drift down the kiln. Eighteen per cent oxygen at the exhaust fan of a tunnel kiln is common. While this curve assumes the 2% optimum if it were based on 6% the saving over the 18% at 400°F would be sub-

The Ultimate in Conveyor Flexibility

The CIRCLE-VEYOR

A Product of PELM's Personalized Engineering

With the new CIRCLE-VEYOR, brick can be conveyed in any direction and around as many turns as necessary—handles green or burnt ware, at speeds to match the highest production rates, without chipping or damaging the brick. Brick never touch each other.



Circle-Veyor Is Designed To Solve These Production Problems:

- Extending off-bearing line for glazing and texturing.
- Adding Space for drying brick before it is set.
- Extending present setting systems into new areas of the plant.
- Revamping present production areas without the expense of moving large machinery.
- Handling finished brick from tunnel kiln cars to packaging and storage areas.

Our job is to solve your problems. Write us the details today.
MATERIAL HANDLING • PLANT LAYOUTS • TUNNEL KILNS • GLAZING

PELM RESEARCH & DEVELOPMENT CORPORATION

46 City Terrace • Newburgh, New York • Phone: JO 1-0010

Circle Service No. 58

0.2% N Silicate liquefies stiff clay mud.

For Fluidity, Use N SODIUM SILICATE...

Sodium silicates are economical dispersants and deflocculants. They are widely used as additives for natural earths.

When water content must be kept to a minimum, silicate is the convenient, effective liquefier; for example, the preparation of slips for casting, molding and coatings, in slurries, in clay processing, in the dispersion of pigments and minerals.

PQ specializes in soluble silicates and can fill your requirements for either dry or liquid silicates. The benefit of our century's experience in silicate manufacture and use is available to you.

1831-130th Anniversary-1961

Soluble PQ Silicates

PHILADELPHIA QUARTZ CO.

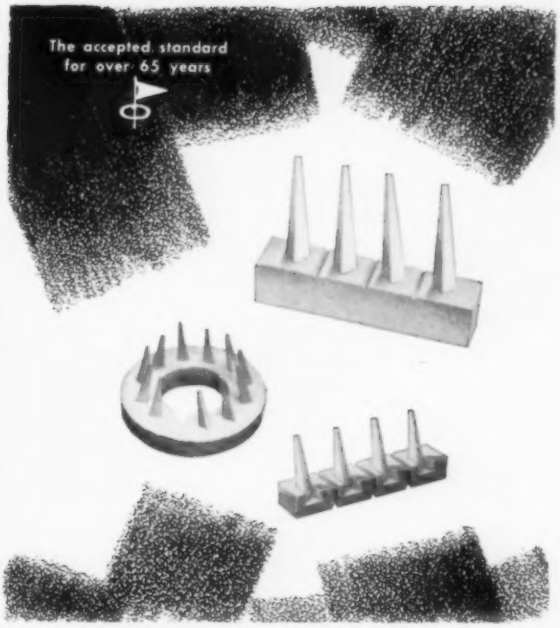
1148 Public Ledger Bldg. • Philadelphia 6, Pa.

Associates:
Philadelphia Quartz Co. of Calif., Berkeley & Los Angeles, Calif.; Tacoma, Wash.
National Silicates Limited, Toronto, Canada

9 PLANTS • DISTRIBUTORS IN OVER 65 CITIES

TRADEMARKS REG. U.S. PAT. OFF.

Circle Service No. 59



for your firing operation---

ORTON CONES

Regardless of your firing operation, there is a sequence of Orton Standard Pyrometric Cones for your needs.

LARGE CONES are available in numbers 022 through 42, including Nos. 31½ and 32½, but excluding Nos. 21, 22, 24 and 25.

SMALL CONES from No. 022 through 12 are stocked, and small cones Nos. 13 through 20 are available on quantity special orders.

P.C.E. CONES are available in numbers 12 through 42, including Nos. 31½ and 32½, but excluding Nos. 21, 22, 24 and 25.

D & E CONES (Decorating and Enameling) are available in a series from 520°C to 1000°C at 10°C intervals on special order. These cones may be used in glass-to-metal sealing, ceramic and enamel decorating and porcelain enamel firing. Write for details.

SPECIAL CONES for specific firing problems can be made to order. Request details.

PLAQUES (either two or four hole) for large cones are available in a composition for use through Cone 16, and in another composition (four-hole only) for use through Cone 36. Four-hole plaques for small cones are available in the same compositions.

STEEL MOLDS for making cones for the ASTM (P.C.E.) Test are available. Round plaques for the P.C.E. Test are not made or sold.

Request the newly revised edition of "The Properties and Uses of Pyrometric Cones."

Foreign Sales: International Division, The Ferro Corporation, 4150 E. 56th St., Cleveland, Ohio, or the Foundation

the firing insurance of thousands

The Edward ORTON Jr. Ceramic FOUNDATION

1445 Summit St., Columbus 1, Ohio, AXminster 9-8023

Circle Service No. 60

stantial. It is very simple mathematics to multiply this times your fuel cost per month to come out with a monthly figure of savings that might be gained through the use of gas analysis.

Acknowledgement—Research work and calculations necessary to presenting the relationship of combustion temperature and excess air was performed by D. H. Gray, Bailey Meter Company Limited, Montreal.

Bibliography

"Tunnel Kiln Instrumentation & Control —Present & Future", Pocock, R. E. Presented at Southwest Section Meeting of American Ceramic Society, September 22-24, 1960, Dallas, Texas.

Develop Test Technique

In connection with SCPRF's extensive structural testing program required in the development of the high-bond mortar project, Clar Monk and his staff have developed a new nondestructive structural testing technique. Early indications are that test specimens for this new method can be prepared in a minimum of time and, in a very few minutes of actual testing, their moduli of elasticity and shearing quickly determined. This method will augment, or may even replace, previous tedious and lengthy methods.

The principle of the new technique involves the use of special electronic equipment to determine the natural harmonics of the wall assembly through vibration and then mathematically predicting the strain characteristics of the material from the data thus obtained. The usual method involves placing the wall specimen under actual load in a special testing rig and measuring the strains with gauges while the load is being applied. With the vibration technique it will also be possible to determine dynamic stress values (such as developed by blast, wind and earthquake forces) whereas conventional methods produce only static values.

New H-W District Office

Harbison-Walker Refractories Co., Pittsburgh, Pa. has established a new District Sales Office in Charlotte, N. C., effective Sept. 1. Lewis M. Allen has been named District Sales Manager of the new sales district which includes all of North and South Carolina and certain counties in Georgia, Tennessee and Virginia.

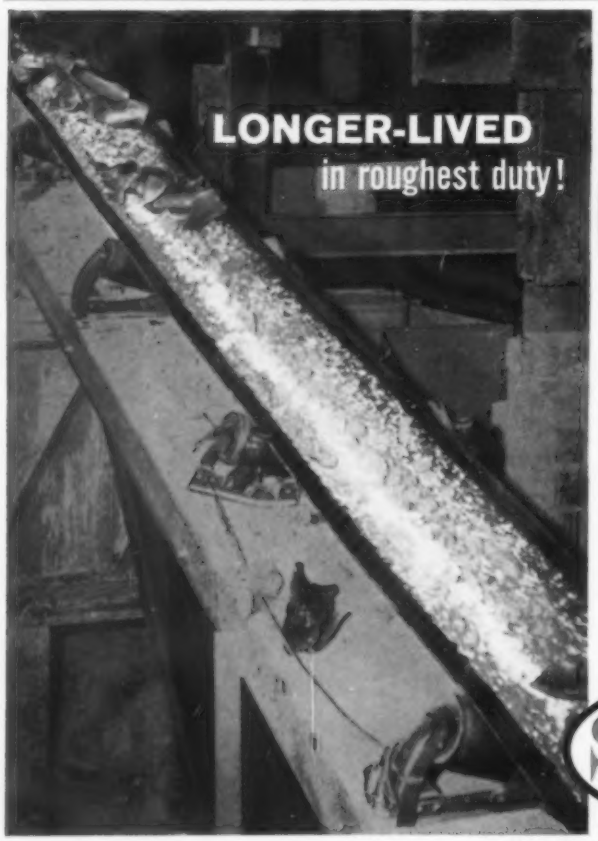
Depletion Bill . . .

(*Continued from page* 65)

supported the bill used such expressions as "gross injustice," "a matter of fairness," "extreme hardship," and "a question of equity and justice" as they added their voices to the chorus of support for the legislation.

Several congressmen raised the issue of the survival of small business in the United States, noting that clay products manufacturers are prime examples of this type of free enterprise. Congressman Charles McC. Mathias, Jr. of Maryland sounded this note as he said, "This is in truth a venerable and highly important industry whose service to the nation has increased, rather than diminished, over the years. It is also in the best tradition of American business—locally based, locally supported, responsible in and to its community, a direct employer of labor and a stimulant to other employment within the range of its market distribution.

"These small independent businessmen compete with each other under highly competitive condi-



A typical Scandura application—inclined conveyor handling raw clay and scrap.

Scandura

GOLD PVC LINE

BELTING

Scandura PVC — the *original* solid-woven polyvinyl coated belting — won its spurs in the heavy ceramics industry, with many installations in Ohio's brick, sewer pipe, ceramic tile and drain tile plants. Today, Scandura PVC Belting is first choice everywhere for drag conveyors, off-bearing conveyors, bucket elevator belts and transmission belts — offering unmatched strength and endurance. Write for the Scandura facts; also for full information on our Fentonia and Scandinavia solid-woven bituminous treated brands for inclined scrap return conveyors and measuring belts.

Manufactured by

Scandura INC.

North Tryon Street
at Keswick Avenue
(P. O. Box 949)
Charlotte 1, North Carolina

Circle Service No. 78

ORGANIC BINDERS

GLUTRIN

(liquid)

or

GOULAC

(powder)

Especially suitable for increasing the molding and dry strength of

- **BRICK**
- **CLAY REFRACTORIES**
- **NON-CLAY REFRACTORIES**
- **SILICA REFRACTORIES**
- **REFRACTORY CEMENTS**
- **PLASTIC REFRACTORIES**
- **TERRA COTTA**
- **STRUCTURAL TILE**
- **SEWER PIPE**
- **SAGGERS**
- **FLUE LINING**

Small amounts required—easy to use. Economical and larger production of first quality produc. absorbs the investment many times.

Many successful users. We'll be glad to submit samples and our suggestion on procedures and amount needed.

Robeson Process Company

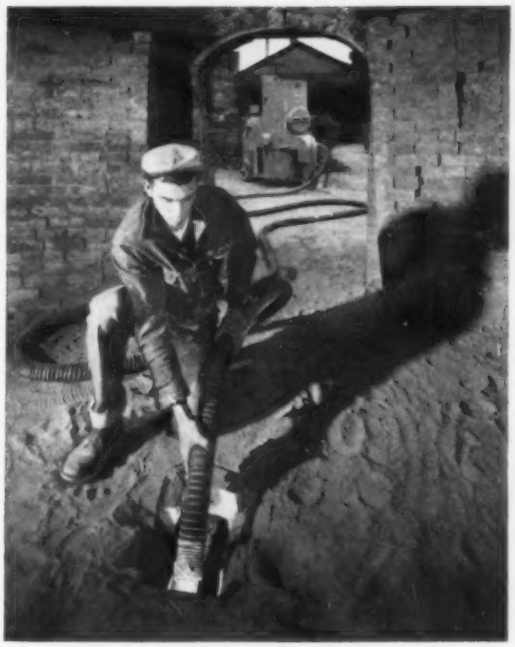
P.O. Box 960 • Erie, Pa.

Plant - Johnsonburg, Pa.

Circle Service No. 62

Hoffman saves 80%

ON LABOR COSTS... INCREASES BRICK PLANT EFFICIENCY 20%



portable HOFFCO-VEYOR provides fast, safe conveying and cleaning

THE PROBLEM

In this plant, brick chips and sand falling into flue openings of periodic kilns regularly cut off the draft necessary to maintain 2000° temperatures. To maintain production schedules, kilns had to be cleaned at temperatures of over 100°F. Despite the use of special gloves, fingers and hands were often bruised and burned. Rejects and labor costs were extremely high.

THE SOLUTION

The answer to the problem was the HOFFCO-VEYOR 100. With this 10 HP portable, a kiln can be thoroughly cleaned in an hour—be free for maximum production in one-eighth the time formerly required. Suction cleaning of chips from clogged flues and jammed wells is accomplished by one operator working from a safe vantage point. The painstaking job of uncapping and recapping pits, mass brick shifting and tedious hand removal of chips are all eliminated. The HOFFCO-VEYOR does the job quickly and efficiently.

For detailed information on ways and means the HOFFCO-VEYOR can cut labor costs—increase efficiency in your brick plant, write for case history and specifications.

AIR APPLIANCE DIVISION

HOFFMAN INDUSTRIES, INC.

A SUBSIDIARY OF HOFFMAN INTERNATIONAL

103 Fourth Avenue • New York 3 • ORegon 7-3600

Circle Service No. 63

The Leahy® Heated Screen Saves Power Costs

THE Leahy NO-BLIND VIBRATING SCREEN

— offers —
INTEGRATED HEAT SCREENING

The mechanical operation and jacket heating of a vibrating screen should consider power consumption a major cost factor. The Leahy screen is therefore engineered to economize on power in these important ways:

(a) Jacket only is vibrated. The heavy screen frame is for stability and containment purposes only.

(b) For maximum transmission and utility of current, oversize bus bars direct-connect the transformer to the jacket. Not only is power saved, but troublesome flexible connectors are eliminated, making it unnecessary to break or remake connections during jacket changes.

Many other features also contribute to the efficiency of this leading screen. For full information, send for Bulletin 16-EH.

THE DEISTER CONCENTRATOR CO., INC.
The Original Deister Co., Est., 1906
913 GLASGOW AVENUE FORT WAYNE, INDIANA
Circle Service No. 64

tions, much to the advantage of the consumer and taxpayer, since the result is a low margin of profit which creates low prices," the Maryland legislator continued. "It is much to our advantage to do everything within our power to maintain this vigorous spirit of free enterprise and to ward off interference by government which would destroy that pattern of competition," he added.

Finally, when the gavel was sounded and the vote taken, more than the necessary two-thirds of the House voted for the bill and it was passed without a single vote in opposition.

The clay products industry immediately turned its attention to the United States Senate where the bill faced another tough fight.

Oswald Appointed VP

Richard E. Oswald has been elected a vice president of the Oswald Refractories Co., Inc., St. Louis, Mo. He is also vice president and sales manager of the Alsey Refractories Co., Alsey, Ill.

Parmanco **SPECIALISTS IN AUGER TYPE DRILLS**

NOW . . . GREATER DRILLING POWER

A DRILL THAT DOES THE JOB FASTER AT LESS EXPENSE TO YOU!

MODEL F-86B
Mounts on any ½ ton or larger truck

- Full 6′ twin hydraulic cylinder feed for faster drilling and more pulling power.
- Simplified control. All controls are centralized at rear of drill.
- Time saving clutch. Three speed independent transmission and 10″ spring loaded truck clutch.
- Auger drills to 100 feet.

Complete information on request.

MODEL F-86
Jeep mounted

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS
Circle Service No. 65

ECSA Meeting . . .

(*Continued from page 73*)

mentals which permit us to consider lightweight aggregates as an engineering material. The basic data concerning the mix design will, of course, vary with the properties of the particular lightweight aggregate."

An interesting description of highlights of a 5-weeks' tour of Soviet Union industry provided the concluding minutes of Mr. Gruenwald's paper. He described Russia as a "large industrial complex," with cement-making facilities that are comparable to those in America. Russia, with its abundance of manpower, may use 600 employees in a plant that in the U. S. would employ no more than 200. Beauty of design is no barrier to construction, and box-like precast concrete dwelling units are a common sight. He said the Russians, who lost 70,000 villages during World War II, have a long way to come before overcoming their shortage of modern housing but are "determined" to get on with the job. Engineers are generally friendly and allow picture-taking without restriction, but the ever-present "political" observers say "nyet."

Open Forum

An open forum discussion was held under the chairmanship of B. K. Powers, vice-president of ECSA and vice-president of Virginia Lightweight Aggregate Corp., Roanoke, Va. In nearly two hours of "give and take" questions, a wide range of subject matter was developed. "What's the answer to full efficiency from the ignition bed? What makes the most effective fuel ignition mixture? What percentage of operating hours has been found to yield the top plant productivity? What production per man hour should a good, modern plant expect to attain? What is the largest size raw material being put in sintering machines for lightweight aggregate production? What has been the experience of lightweight aggregates in prestressed concretes?" These and many other inquiries were aired.

On Friday, a special bus took the group to Tamaqua for a tour of the Lelite plant, with a luncheon at the Edgemont Club in nearby Lansford, and an afternoon at the new $1,500,000 Greenwood Breaker, source of Lelite's shale. This is the heavy media preparation plant constructed just last year and has a productive capacity of nearly 6,000 tons of finished anthracite coal per day. The strip mine operations of Greenwood, which reach a vertical depth of nearly 800 feet and which are serviced by a fleet of huge 30-ton-capacity trucks working on a 24-hour round-the-clock basis, were inspected with considerable interest by the group.

The meetings adjourned late Friday upon the group's return from the plant and strip mines tour. At a subsequent meeting the ECSA board of directors, the group authorized a continuance of the unit weight testing program with all data to be made available to ASTM Subcommittee 3-F (Lightweight Aggregate and Lightweight Aggregate Concrete).

Capacity Output

Executive Secretary T. R. Berger, in his report for the six months of 1961, said "The general feeling seems to be that the volume of the light-

Tabor's 4-Poster Inverted Jolt Machine, designed especially for floating dies, uses two 525 lb. anvils, striking top and bottom of the mold, at the same time that 12,000 lb. squeeze is applied, for properly compacting deep molds. Also available with single jolter below the molding table for shallow work.

NEW DOUBLE JOLTER For Efficient Molding Of Heavy Refractories

Now, many deep refractories can be properly compacted clear to the center of the mold with the new 4-Poster Inverted Jolt Machine by Tabor. While a 12,000 lb. squeeze pressure is being applied, the mold is being struck 7 times every second by each of two 525 lb. anvils, one above and one below the molding table. This constant jarring improves grain orientation, lateral flow and surface finish.

No matter what type of refractory you mold — deep units or shallow ones, large sizes or small, intricate shapes or flat shelves — talk to Tabor about the new jolting method. It's much faster than hand-ramming. No expensive press equipment to be purchased. Production and quality are both increased. Call or write us today. ULysses 5-5131.

TABOR MANUFACTURING CO.
Division of Turbo Machine Company
LANSDALE, PA.

TABOR
TRADE 1884 MARK

Circle Service No. 75

no more downtime to replace connectors...

HANCO FLUX POWER SCREEN HEATERS

transmit power through the air!

With the all new Flux Power by Hanco all mechanical connections between transformer and screen are eliminated. The 0 to 4000 ampere current is transmitted through the air by inserting a conductor through the eye of the transformer. This permits unrestricted vibration, maximum power transmission and true screen balance.

5 YEAR GUARANTEE

★ Dust-tight, waterproof construction
★ Dual voltage, 220/440 volt
★ Use either plain or stainless cloth
★ Anti-magnetic steel side rails

write today for full details:

HANCO INTERNATIONAL

CANTON 7, OHIO, U. S. A. — CABLE HANCO

EUROPEAN SALES AND MFG.
HANCO INTERNATIONAL
6 WIBAUTSTRAAT • AMSTERDAM, HOLLAND

Circle Service No. 76

weight aggregate industry is on the way up and that by the end of 1961 our expanded clay and shale lightweight output will be at virtually capacity levels. One thing is certain. Competition in the months to come will be keener than ever. A number of new lightweight aggregate plants are scheduled to go into operation very soon, particularly in the populous eastern coastal states wherein reside about one-fifth of the nation's people. This could well mean an intensity of competition for new and existing markets unprecedented in the relatively youthful history of the lightweight aggregate industry. This is going to require each and every lightweight aggregate producer to evaluate seriously and thoughtfully his marketing techniques, his plant efficiency, his cost picture and his basic philosophy of action."

Said Berger: "Your executive secretary cannot recall any period where there was a greater flow of announcements and reports on new or projected lightweight aggregate plant construction. It is impressive to contemplate the rate of growth in terms of numbers of plants, particularly in concentrated sectors.

HCD Dense Calcined

KAOLIN GRANULES

Low in Iron and Alkalies. Ideal for Refractory, Shapes, Castables, Chemical Ware

Typical Chemical Analysis

Alumina	43.00	Titanium Oxide	1.40
Silica	55.00	Lime & Magensia	1.10
Iron Oxide	0.12	Soda & Potash	0.23

Physical Characteristics

Angular Shaped, Dense Crystaline Mullite Matrix with High Mechanical and Thermal Stability.

TRY #34 CALCINED KAOLIN TO REDUCE GLAZED BRICK DRYING CRACKS

Send for Testing Samples

SOUTHERN CLAYS, INC.

33 RECTOR STREET,
NEW YORK 6, N. Y.

Circle Service No. 77

Answers thousands of questions on properties and uses of engineering materials!

Now Available . . .

ENGINEERING MATERIALS HANDBOOK

1952 *pages*
6 *x* 9
678 *illus.*
$21.50

Editor-in-chief: CHARLES L. MANTELL

HERE ARE ALMOST 2000 PAGES OF ANSWERS to both routine and unusual problems that crop up whenever engineering materials are being selected. Technical tables—design information—structural characteristics—tabular data—a wealth of useful and specific facts—are all made quickly available. Comprehensive and authoritative, this handbook considers materials from the viewpoint of engineering structures, machinery, and equipment. It gathers together in one volume the information needed by **everyone** concerned with design, structure, and serviceability. An 83-page index pinpoints the facts you want in an instant! **Prepared by over 150 specialists; Editor-in-Chief: Charles L. Mantell, Chairman, Dept. of Chemical Engineering, Newark College of Engineering.**

Instant, authoritative reference —

• Covers all common and not - so - common materials • Gives complete data on important design properties • Emphasizes fabricated or commercially available forms • Allows quick comparisons among alternate materials • Gives specific use recommendations • Permits accurate prediction of behavior.

BRICK & CLAY RECORD BOOK DEPT.

5 South Wabash Ave., Chicago 3, Ill

ADVERTISERS INDEX

A

Acme Steel Co. 50-51
*American Clay Machinery 102

B

*Babcock & Wilcox Co. 6
Bell Clay Co. 7
Bickerstaff, Inc. 61
Bradney Machine Co. 86
Brick & Clay Record 96

C

Cahners Publishing Co. 63
*Carpenter Engineering Service 81
Case (J. I.) Co. 16-17
*Ceramic Color & Chem. Corp. 86
*Chambers Bros. Co. 12
*Chase Foundry & Mfg. Co. 78
*Chisholm-Boyd & White Co. 31
Classified Ads 98-99
Clearfield Machine Co. 57
Columbia-Southern (Div. Pittsburgh Plate Glass Co.) 89

D

Des Moines Glove & Mfg. Co. 97
*Diester Concentrator Co., Inc. 94
Dow-Corning Corp. 55
*Drakenfeld (B. F.) & Co., Inc. 9

E

Ehrsham & Sons Mfg. Co. 87
Elberfeld Mfg. Co., Inc. 78

F

*Fate-Root-Heath Co. 101
*Fernholtz Machinery Co. 99
*Ferro Corp. 15

G

*Garden City Fan & Blower Co. 77
*Gravely Tractors, Inc. 62

H

Handle, (Karl) & Sohne 89
*Hannon (F. R.) & Sons 96
*Harrop Ceramic Service Co. 59
*Hendryx (Dwight B.) & Assoc. 52
Hoffman Industries, Inc. 93
Hough (Frank G.) Co., The 3

I

*International Clay Machinery Co. 76

J

Jeffrey Mfg. Co. 33

K

*Kennedy Van Saun Mfg. & Engr. Co. 48
*Kimberly-Clark Corp. 2

L

Link-Belt Co. 49, 76

M

*Metal & Thermit Corp. 20
*Miller Equipment Co. 11
*Minneapolis-Honeywell Regulator Co. 4

N

*National Engineering Co. (Simpson Mix-Muller Div.) 22
National Paint & Manganese Co. 88
North American Mfg. Co. 56
*North State Pyrophyllite Co. 58

O

*Orton (Edw. Jr.) Ceramic Foundation 91
Overstrom (& Sons) Inc. 80

P

Paris Mfg. Co. 94
Pearne & Lacy Machine Co. 14
Pelm Research & Development Corp. 90
*Pemco Corp. 18
*Pennsylvania Crusher Div. 13
*Philadelphia Quartz Co. 91

R

Rieter-Warke (Van Opel) 19
*Robeson Process Co. 93
*Robinson Ventilating Co. 79

S

Sandvik Steel Co. 82
Scandura, Inc. 92
Signode Steel Strapping Co. 10
Simmons Boiler & Machine Co. 85
*Southern Clays, Inc. 96
Spinks, H. C. Clay Co., Inc. 81
*Star Foundry & Machine Co. 54
*Steele (J. C.) & Sons 100
Stoody Company 74
Straight Engineering Co. 97
*Swindell-Dressler Corp. 34

T

Tabor Mfg. Co. 95
Teale & Co. 85
*Tennant (C.) & Sons Co. 60
Towmotor Corp. 21

U

Unit Crane & Shovel Corp. 32
*U. S. Borax 75

V

Varner Steel Products, Inc. 53

W

West Instrument Corp. 8

This index is a feature maintained for the convenience of the advertisers'. It is not a part of the advertiser's contract and Brick & Clay Record assumes no responsibility for its correctness.

*See our Catalog in the 1960-1961 Ceramic Data Book

You get maximum pugging at lowest cost per ton - - -

MIXMAX PUG MILL KNIVES

Write wire telephone today!

Straight

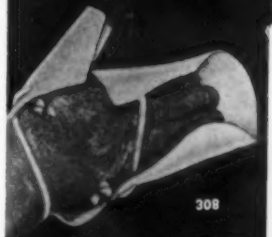
ENGINEERING COMPANY

ADEL, IOWA **Telephone 468-5271**

Circle Service No. 69

AVOID COSTLY INJURIES

LONG-WEARING TUFHORSE MITTENS AND PADS GIVE EXTRA PROTECTION



308

Tufhorse KANT-RIP

DES MOINES GLOVE & MFG. CO.

Des Moines, Iowa

Increase the output of your men. Protect their hands with Tufhorse hand pads, gloves or mittens. Made of heavy, durable cowhide, Tufhorse Kant Rips are flexible, tough, help men work faster.

MAIL FOR FREE SAMPLE

Des Moines Glove & Mfg. Co.
Des Moines, Iowa

Please send free sample of your (.....) hand pad, (.....) glove, (.....) mitten for testing. (Specify which one you want).

Name .....

Position in Co. .....

Address .....

City .....

State .....

Circle Service No. 70

Classified ADS

Limited to Want Ads, Consulting Engineers, or Used Equipment ads, (wanted or For Sale)

TRANSIENT WORD ADS: 15c per word for each insertion.

Headings such as "Wanted", "For Sale", etc. and address to be counted as part of the ad. Minimum charge $3.00 each insertion.

POSITION WANTED ADS: $3.00 for 25 words or less; each add'l word 15c.

FOR USE OF BLIND ADDRESS: (Care of BRICK & CLAY RECORD) count as 15 words to cover cost of handling and forwarding replies.

DISPLAY-BOX TYPE ADS

$18.00 per inch. On advance orders for twelve consecutive issues, $15.00 per inch per insertion. (No retroactive adjustment).

An inch is measured vertically on one column, 2⅛" wide; three columns on a page. For a two-column advertisement add together height in each column.

Display classified advertisements are set and rates apply in half-inch multiples. (1 inch minimum; 5 inch maximum).

Add 25% to above rates for Reverse Plate (white lettering on black background).

All rates based on payment in advance except on regular contract.

No Agency Commission or Cash Discount

BRICK and CLAY RECORD

A CAHNERS PUBLICATION

5 S. Wabash Ave., Chicago 3, Ill.

WANTED—HELP

CERAMIC ENGINEER

Gladding, McBean & Co. has an opening for a Quality Control Engineer in their Refractories Division. Location would be in California. Send complete resume to:

Mr. J. D. Heywood

Gladding, McBean & Co.

2901 Los Feliz Blvd.

Los Angeles 39, Calif.

CERAMIC ENGINEER—Young, aggressive man with background in refractories. For sales, service and development work on refractory products for metallurgical, oil refinery, power generating plants, etc. Challenging opportunity for a man who has had experience either in the laboratory or field who wants to move ahead. This is an old, established refractories manufacturer with young, enterprising personnel, that is branching out into new fields. All replies confidential. Box 9-BGB care of Brick & Clay Record.

WANTED—HELP—Ceramic Engineer for quality control in Virginia plant. Soft mud and stiff mud brick, tunnel kilns. Give complete data and salary requirements. Excellent opportunity. Box 9-BGD care Brick & Clay Record.

SUPERINTENDENT—Wanted for hollow ware and farm drain tile with some experience in these lines. Write Box 8-BHT care of Brick & Clay Record.

POSITION WANTED

CERAMIC ENGINEER with exceptional record in production management desires responsible position in structural clay products. Capable of responsibility, leadership and execution of authority necessary for plant operation at high level with top quality product. Write Box 9-BGC care of Brick & Clay Record.

POSITION WANTED—Eastern United States. Sales or Production. Graduate ceramic engineer. 38 years old. Willing to travel extensively and relocate. Reply Box 9-BGK care of Brick & Clay Record.

EXPERIENCED Production man in structural clay products desires responsible position with progressive company. Age 37—10 years experience in all phases of operations from pit to finished product. Reference furnished on request. Wire or write: O. W. Osborn, Jr., Carbon Cliff, Illinois.

CREDIT MANAGER—Have 14 years experience with leading Clay Products Manufacturer in Distributor, Dealer, Consumer Relations. Have Good Accounting Background. Will relocate. Write Box 9-BGH care of Brick & Clay Record.

WANTED

WANTED—Clay washing equipment and filter press, good condition. Mail full description price. Address Box 9-BDC care of Brick & Clay Record.

WANTED—Second-hand 3,000°F. shuttle-type kiln, gas or oil fired, not less than 50 cubic ft. capacity. Write Box 9-BGL care of Brick & Clay Record.

WANTED—Silicon Carbide Scrap. Peterson Foundry Supply Co., 39th Place and S. Racine Ave., Chicago 9, Ill., Telephone: BIshap 7-3103.

FOR SALE—USED EQUIPMENT

FOR SALE

Eagle 9' dry pan with or without 50 h.p. motor & drive. 1948 model.

MECO 48" x 96" Vibrating Screen. 1948 Bucket Elevators 31' and 47'.

MECO disc feeders—large capacity blowers.

IOWA PIPE AND TILE CO.

DES MOINES, IOWA

USED EQUIPMENT FOR SALE

Arnold-Creager, soft mud, 6 brick mold, brick machine
Reif Sander
Cable Hoist
Double roll disintegrator
2—Side dump clay cars
1000 ft. rail & swith
50 HP GE variable speed, 220V Single Phase, electric motor with V-belts and sheave, & starter
10 HP electric motor & starter
Large Sturtevant blower
High compression blower

ARTHUR G. MEIR

Route #1 LaCrosse, Wis.

Phone: 2-1362

(5 miles south of LaCrosse on Hy. 14.)

FOR SALE

10' Diam. Clearfield Maximuller, V drive, Timkin Step.
HUMMER SCREEN 4' x 10' Heated.
BELT FEEDERS to Maximuller and Brick Machine.
BRICK MACHINE Steele 50 Model C, de-aired, separate motor drives.
CUTTER Steele 18 Special L.H. 2¾" cut.
DRYER CARS, 250—Tripple deck, 24" Gauge. Chase, with car puller.
T—IRON RAIL, 20 Tons 16 lb.
TURBO BLOWERS—4 National #324, 15 HP.
OIL TANKS—2—12,000 gal with Steam—coils, Horizontal, with 40 HP Package boiler & Pumps.
BUILDINGS—50' x 150', ¾" x 8" kiln bands. Lorain T5, 1 yd shovel for parts. Many other valuable items.
Plant located at Woodbridge, Va., Route U.S. 1—30 Miles South of Washington, D.C., Phone Woodbridge 494-2744, if no answer call:

HERMAN A. HALL, Wyomissing, Pa., Phone: FRanklin 2-4310, or Forrest Paschal, Siler City, N. C., Phone: SHerwood 2-2500.

LIQUIDATION SALE

FORMER UNIVERSAL-RUNDLE PLANT
MILWAUKEE, WISC.

BOILERS
CLEAVER BROOKS—200 HP—Gas & Oil—Package
KEWAUNEE—30 HP—Type "C"—Gas & Oil

BUCKET ELEVATORS
1—5" x 8" Buckets, Ctrs.—50'
1—8" x 12" Buckets, Ctrs.—55'
5—8" x 16" Buckets, Ctrs.—34', 46', 50', 50', 55'

CONVEYORS — APRON
2—REX—30" x 4" Pan, Ctrs. 36', 54'

CONVEYORS — BELT
2—18" Flat—Ctrs.—11', 60'
1—20" Flat—Ctrs.—54'
4—24" Flat—Ctrs.—8', 11', 50', 55'
1—36" Flat Packaging—Ctrs.—30'
1—14" Trough—Ctrs.—14'
1—16" Trough—Ctrs.—16'
3—20" Trough—Ctrs.—76', 96'
6—24" Trough—Ctrs.—16', 16', 20', 31', 39', 86'
2—Farquhar Car Unloaders—18" x 19', 25' Ctrs.

CONVEYORS — OSCILLATING
1—SIMPLICITY—24" x 6" x 8'
2—SIMPLICITY "PA"—30" x 12" x 24', 44'
1—SIMPLICITY—46" x 12" x 15'

SCREENS
1—ROBINS 3' x 8' Vibrex—5 HP
1—SIMPLICITY 4' x 8'—88—5 HP

AAA MACHINERY & EQUIPMENT
BOX 4748 MILWAUKEE 15, WISC.
PHONE EV 4-6650

JUST PURCHASED

1—6' x 150' rot. kiln, ⅝" welded.
1—Bonnot 5' x 10' contin. ball mill, 75 HP.
1—Symons 2' shorthead cone crusher.
1—Symons 4' shorthead cone crusher.
1—Denver 4' x 10' contin. rod mill, 60 HP.
1—8' x 60' rotary kiln, ½" welded.
1—Allis-Chalmers 6' x 12' rod mill, 125 HP.

IN STOCK

1—Vulcan 10' x 11' x 175' rotary kiln, 13/16" shell.
2—National 10' x 78' rotary dryers, ¾" shell.
1—Traylor 8' x 80' rot. kiln, ⅝" welded.
1—7'6" x 62' rot. cooler, ½" shell.
1—Allis-Chalmers 7' x 120' rot. kiln, ⅝" welded.
2—Bonnot 7' x 110' rot. kilns, ⅝" shell.
1—6' x 7' x 100' rot. kiln, ⅝" shell.
2—4'-9" x 32' rotary dryers, ⅝" shell.
1—Standard 3' x 23' rot. dryer, ¼".
1—Raymond 66", 6-roller hi-side mill.
1—Raymond 50", 5-roller hi-side mill.
2—Hardinge 7' x 36" conical pebble mills.
3—Allis-Chalmers 5' x 22' ball-tube mills.
6—Jaw crushers: 36" x 15", 24" x 13", 20" x 6", 18" x 9", etc.

PERRY EQUIPMENT CORP.

1432 N. 6th St. Phila. 22, Pa.

POplar 3-3505

ONE Steel Model 20-E combined auger de-airing machine and one Model 20-E.
FIVE assorted brick dies, ' hollow tile-patio die and roman brick die.
ONE, Steel No. 40-E combined de-airing machine
ONE, Real Hand cutter.
ONE, Steel No. 18 Automatic Cutter.
ONE, International De-airing Combined Falcon, with extra liners knives, pinion shaft resurfaced augers—good condition.
ONE, American Automatic No. 858 Automatic Electric Cutter good condition.
TWO Fernholtz 48" cage type ulverizers, one SK.F. bearing the other water cooled babitted bearing, all good condition.
ONE, No. 1 and No. two Paird Pot Machines with seven pot dies, all good condition.
ONE, Model W.6422 4½ x 4 twin cylinder water cooled Quincy Vacuum Pump excellent condition.
ONE, 4' x 40 ft./horizontal refractory lined dryer with stack combustion chamber 5½ hp. motor gear reduction drive Johnson oil burners, good condition.

FERNHOLTZ MACHINERY CO.
8468 B Melrose Place, Los Angeles 46, Calif

DESIRABLE EQUIPMENT AT REALISTIC PRICES

Crushers and Hammer Mills
Muller type Mixers-Mills
Rotary Dryers and Kilns
Sifters, Screens, Separators
Filter Presses and Filters
Ball & Pebble Mills
Raymond Imp Mills, All Sizes
Presses and Pellet Machines

Send for "First Facts"

FIRST MACHINERY CORP.
209-10th St. Bklyn. 15, N.Y.
ST. 8-4672; Cable "Effemcy"

DE-AIRING MACHINES—FRH (PA4) 3HP—FRH (PR6) 7½HP—J. C. Steele 50 Special, 15" auger 100 HP—Bonnot 18" auger 150 HP—American (801) 18" auger 200 HP

CUTTERS—Automatic Reel—J. C. Steele #18—Freese P25, 10" belt—Chambers #10, Roman & Norman brick

PUG MILLS—9' Freese—10' American (2nd shaft)—15' Granulators Freese/Chambers

DRY PANS—7' American—9' Bonnot—2 American 418 grinders

DRYERS—24" x 24"—3' x 24'—5' x 40'—6' x 20'—7' x 58' (50 HP gearmotor)

CRUSHERS—DISINTEGRATING—18" x 16", 24" x 12"—30 x 16—24 x 30

LAWLER COMPANY

Metuchen, N. J. **Liberty 9-0245**

FOR SALE: Crawler Shale Planer, FRH6 & Jr, Steele #30, #40, Chambers #11C & Royal deairing; Freese GH, Steele #1, #2, Ray, Amer. 404 nondeairing stiff mud; 36" & 42" soft mud Brick Machines, 5' to 10' Dry, also Wet Pans, Lehmann 7' Mixmuller, Dixie 5060 Hammermill, Pugmills, single & double roll Crushers, Vibrating Screens, 450 24" ga. 112 25" ga. 300 26" ga. 180 28" ga. Dryer Cars, Komarek Greaves Briquetting, Stevenson Sewer Pipe, Boyd 4 mold Dry Presses, 4 two mold Represses, Steele #18 Cutter, Tunnel Kilns and Kiln Cars, 4x10, 8x125 Rotary Kilns, 5x17, 5x21 Rotary Dryers, Coolers or Ball Mills. Mid-Continent Equipment Co., 8321 Gannon, St. Louis 32, Mo. Wydown 1-2826.

FOR SALE—USED EQUIPMENT

WALTER C. STOLL & SONS
New and Used CLAY WORKING MACHINERY
5028 Alhambra Ave., Los Angeles 32, Calif.
CApitol 2-1141

---

250 Chase Double Deck Cars
250 Single Deck Cars
Rails and Accessories

M. K. FRANK
Grand Central Palace, New York 17, N. Y.
401 Park Bldg., Pittsburgh 22, Pa.

RAILS—TIE PLATES
Frogs & Switches
Track Accessories
W. H. DYER CO., INC.
1811-B Railway Exchange Bldg.,
St. Louis 1, Mo.

DEAIRING BRICK MACHINES—3 sizes
PUG MILLS—8', 10'—Single & Double Shaft
GRANULATORS—Chambers #51 Freese P-16
CUTTERS—Chambers, Steele #18 & Hand
DRY PANS—7' & 9'
HAMMER MILLS—Many Sizes
SMOOTH ROLLS—12", 18" & 24"
CONICAL ROLLS—Chambers & Brewer
DISINTEGRATORS—12", 16", 24"
JAW CRUSHERS—Many sizes
GYRATORY CRUSHERS—Allis Chalmers #5

50/100 + p.h. CRUSHING PLANT w/Conveyor, Screen, Bag House

FEEDERS—5' Disc, Apron, Reciprocating
ROTARY DRYERS—24" to 8' Diam.
DRY MIXERS, Lancaster SKG, #3, #4, Simpson #3 Clearfield #610
SIGMA BLADE & RIBBON MIXERS—Several
SCREENS—Many—Single & Double Deck
HARDINGE CONICAL MILLS—4½', 6', 8'
BALL & PEBBLE MILLS—Many Sizes
LAB SIZE—Crushers, Mixers, Screens
SLIP LAWNS—Crossley Double Deck
HAND TILE PRESS

LIST YOUR SPARE EQUIPMENT WITH US
ROBERT L. CLARE
212 Rector St. Perth Amboy, N. J.
Phone Hillcrest 2-0061

FOR SALE or LEASE
Large High Temperature Car Tunnel Kiln

Steel Building 400 x 60 with Railroad Siding along side. Located near Albany, New York with close water transportation facilities.

Write Box 9-BGA
Care of Brick & Clay Record

USED LIFT TRUCKS—Our National Dealer Network offers a complete selection Hyster and other makes many with attachments and devices as is—reconditioned—rebuilt. All types of finance and lease plans. Write—Wire—Phone Used Truck Office Dept. G, Hyster Company, 1040 S. 25th Ave., Bellwood, Ill., EStebrook 9-3515.

FOR SALE—Steele 40 De-Airing Combination Brick and Tile Machine—Eagle Dry Pan—Raymond Dry Pan—Steele End Cutter—Steele No. One Brick Machine—C & G Potts Soft Mud Brick Machine, Bill Taylor, Sulphur Springs, Texas.

FOR SALE—20 Canton Stokers, Model AW10KP, 100 lbs. per hour capacity, ¾ H.P. motor, 220-440-60 cycle, in good working order suitable for kiln firing. Extra motors and parts. Priced to sell. Fenati Brick Co., Inc., P.O. Box 955, New Castle, Pa.

FOR SALE—PLANT

GOOD Small modern brick and tile plant. Large deposit dark and light burning clay; extra good year round market territory. Address Box 9-BBB, Care of Brick & Clay Record.

FOR SALE—Brick Plant with Tunnel Kiln in Pittsburgh, Pa. market. Box 9-BGE care of Brick & Clay Record.

BRICK PLANT FOR SALE—Six gas fired kilns. Bargain terms. H. P. David, Lake City, Tenn.

MISCELLANEOUS

FOR SALE—BUFF BURNING FIRE CLAY, lump or ground. Ask for prices at mine or delivered via truck or railway. Booz & Co., Macomb, Illinois.

For Sale—Lower Kittanning buff burning plastic Fireclay. Mine run, crushed, or ground. Consolidated Clay Mines, 265 W. Lincoln Way, Lisbon, Ohio.

FOR SALE—Cone 34 Calcined Flint in lump or ground form and cone 36 High Alumina Nodular Clay. Union Minerals, Inc., 2306 First Natl. Bank Bldg., Pittsburgh 22, Pa.

F. J. FORD
Representative—Engineer
Clay Working Machinery
Car Tunnel Kilns—Dryers
P.O. Box 537, Dallas, Texas
P.O. Box 690, Whittier, California

T. W. GARVE
Registered Professional Engineer
Designs, Reports, Clay Testing
Phone: AM 2-6993
69 West Weisheimer Rd.
Columbus 14, Ohio

Call FERNHOLTZ First!
Fernholtz Machinery Co., 8468 Melrose Pl., L.A. 46

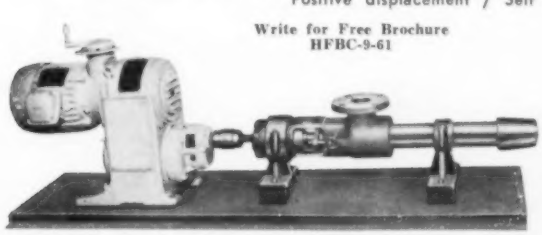
OL 3-2360

"HELIFERN"* Helical Gear Pumps

"Pumps Anything That Flows"

Supplies the Top Pump Performance required at all times . . . Durable / Versatile / Reversible
Passes particles / Pumps solvents in suspension / Low internal velocities / Metered uniform flow
Positive displacement / Self priming . . .

Write for Free Brochure
HFBC-9-61



"Give it a Turn . . .
Call HELIFERN*"

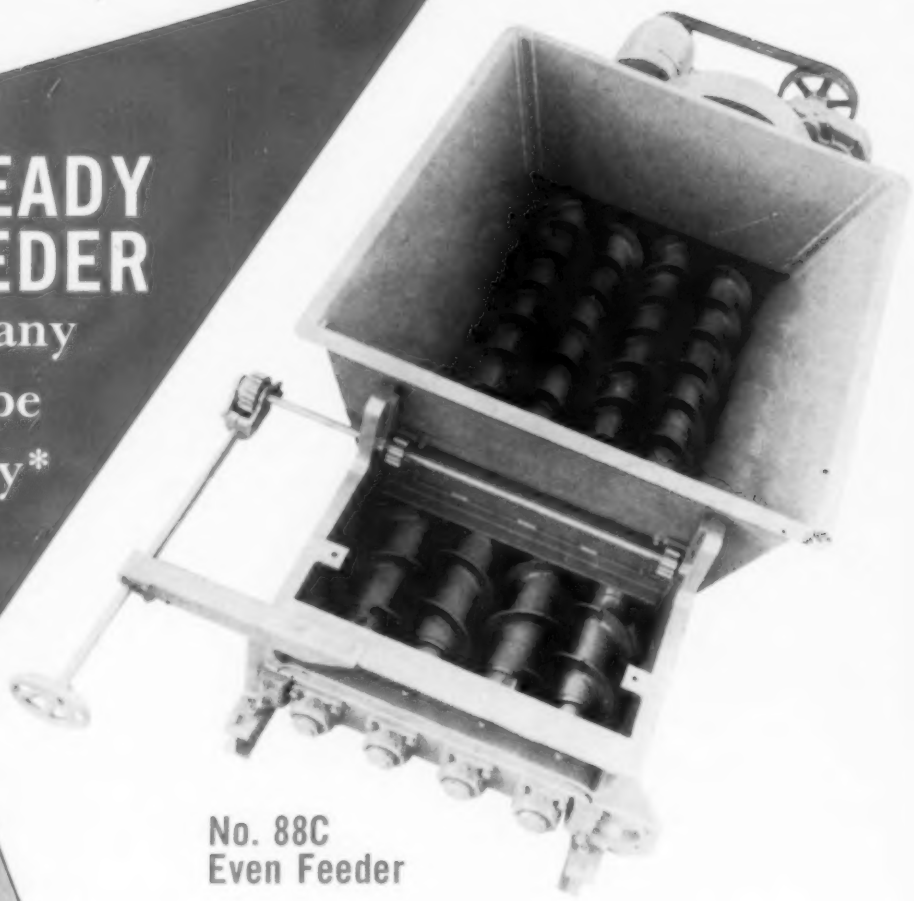
Fernholtz Mfg. Co.
8468 Melrose Place
L.A. 46, Calif. - OL 3-2360

In San Diego
2420 University Ave.
CY 5-3791

*trademark

Circle Service No. 71

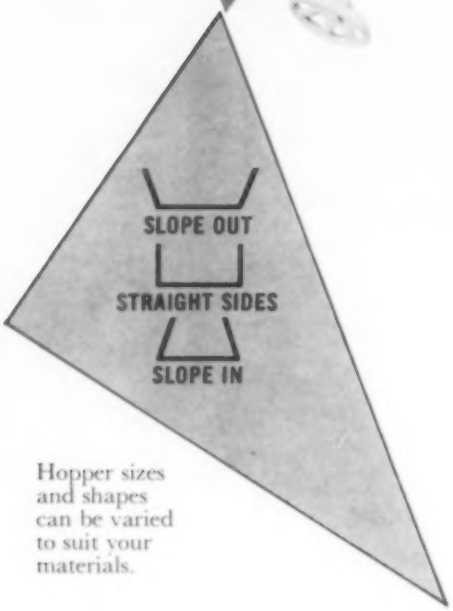
A STEADY FEEDER for any type clay*



No. 88C
Even Feeder

The 88C maintains any predetermined rate of production regardless of weather conditions or moisture content. The four powerful auger shafts can be set for any given speed from a minimum of 6 RPM to a maximum of over 20 RPM. Adjustments are made by raising or lowering the gate.

This feeder is often used to feed directly into pug mills: also to feed out of storage bins. Its big hopper area prevents arching, bridging, and choking.



Hopper sizes and shapes can be varied to suit your materials.

* Except for big rock-hard lumps

OTHER STEELE FEEDERS

No. 44C—for dry materials
Double 88—for exceptionally wet clays, or for very high production.

Write for full details and for free consultation.

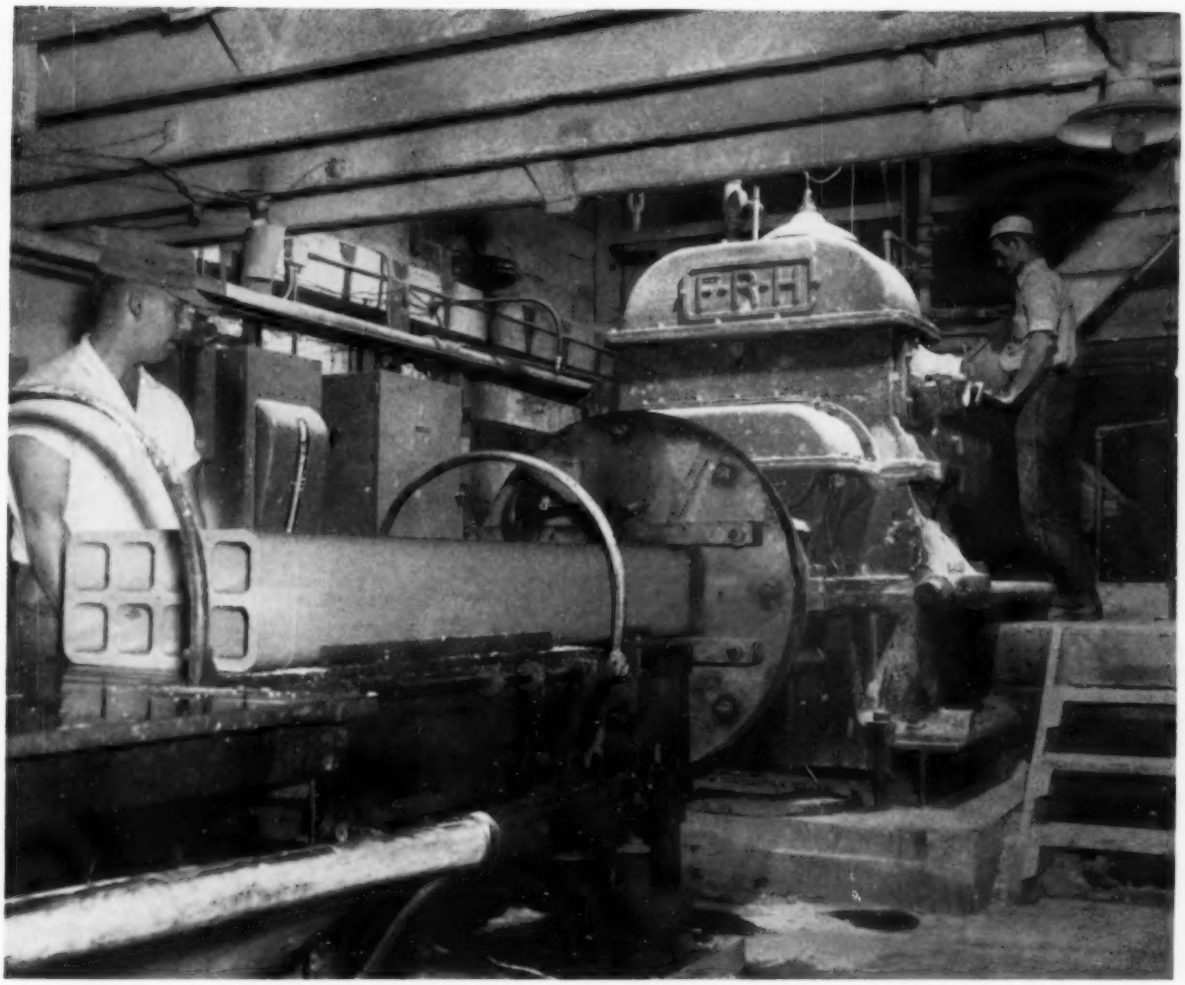
SUSTAINING ASSOCIATE SCPI

J. C. Steele & SONS, Inc., Statesville, N. C.

Pacific Agents: Walter C. Stoll, 5028 Alhambra Ave., Los Angeles 32, Calif.

THE BEST IN CLAY MACHINERY SINCE 1889

Circle Service No. 72



"F-R-H De-airing Extrusion Machines . . . ideal for producing conduit, other heavy products"

Report Brazil Hollow Brick & Tile Company, Brazil, Ind.

Brazil Hollow Brick & Tile Company, Brazil, Indiana uses two F-R-H Model "WJ" de-airing extrusion machines in the production of clay telephone conduit. Production of 150 tons of conduit per 8 hour day is maintained using one machine or the other to extrude sizes as needed.

Here's what W. M. Price, president of the Indiana firm has to say about the performance of F-R-H equipment:

"We find F-R-H de-airing machines particularly well suited to the production of heavy clay products — such as the telephone conduit we manufacture, and repairs on our F-R-H equipment have been very minor—especially so, considering that 1 F-R-H unit has been in continuous operation for 30 years—the other, for 12 years. Parts replacement does not disturb the permanent seal of the vacuum chamber." Find out today how F-R-H Brick and Tile Machines can increase production, improve product quality, reduce operating and maintenance costs *for you.* Simply send a brief outline of your operations to The Fate-Root-Heath Company, Dept. B-1, Plymouth, Ohio.

F-R-H

CERAMIC MACHINERY

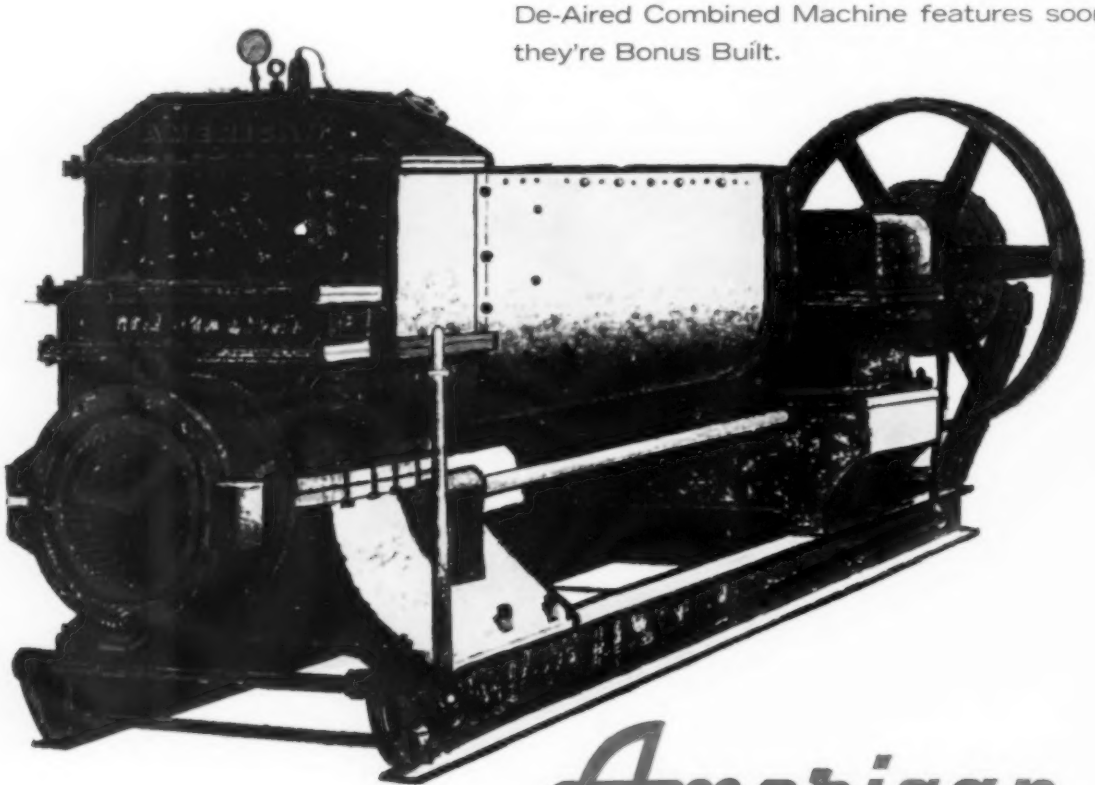
FOR 100% OPERATING EFFICIENCY • ORDER GENUINE F-R-H REPLACEMENT PARTS DIRECTLY FROM THE FACTORY

Circle Service No. 73

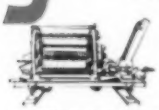
COMBINE THREE OPERATIONS FOR INCREASED PROFITS

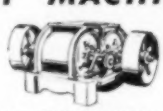
Do Your Job The AMERICAN Way

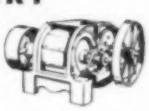
The American De-Aired Combined Machine can increase your plant's profits by handling three jobs fast and efficiently. It pugs, de-airs and extrudes in one continuous operation. Design of the pugging knives, crowders and augers help prevent bridging and clogging of clays which slow down production. The unit is compact and requires only a minimum of floor space. Three models are available to fit every type of application including building and refractory bricks, hollow ware and tiles. Capacities per hour range from 3,000 to 10,000 bricks and 10 to 40 tons of hollow ware and tiles. Check all the American De-Aired Combined Machine features soon . . . they're Bonus Built.



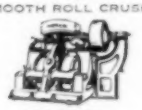
American
CLAY MACHINERY


ELECTRIC CUTTERS


SMOOTH ROLL CRUSHERS


DISINTEGRATORS

PUG MILLS


GRINDERS

DE-AIRED COMBINED MACHINES

DIVISION OF
HUBER-WARCO COMPANY · Marion, Ohio, U.S.A.

Circle Service No. 74